RAILROAD GAZETTE

FRIDAY, APRIL 18, 1879.

Train Accidents in March.

The following accidents are included in our record for the month of March :

REAR COLLISIONS.

On the afternoon of the 4th an engine on the Philadelphia Coal Company's road near Shenandoah, Pa., ran into some coal cars, wrecking several of them. The engineer and a laborer were fatally injured.

On the morning of the 5th a freight train on the Michigan Central road ran into the rear of an extra freight near Hastings, Mich., damaging the engine and wrecking the caboose.

On the 6th a passenger train on the Central Railroad of Georgia ran into the rear of a freight train near Millen, Ga., doing some damage.

On the 10th a shifting freight train ran into an engine in the Atlantic & Great Western yard, in Meadville, Pa., doing some damage.

On the evening of the 13th a freight train on the Lake Shore & Michigan Southern road ran into the rear of a preceding freight, which had stopped to switch some cars at Berea, O. The engine and three cars were wrecked, several others damaged, a brakeman and a passenger in the caboose injured. It is said that the local freight had no signal out.

Very early on the morning of the 20th a freight train on the New York, Lake Erie & Western road broke in two near Sloatsburg, N. Y., and the rear section afterward ran into the forward one, wrecking several loaded grain cars and blocking one track seven hours.

On the morning of the 21st a passenger train on the Central Railroad of New Jersey ran into the rear of a freight train near Nesquehoning, Pa., wrecking an engine and several freight cars and injuring a passenger.

On the afternoon of the 21st a passenger train on the New York, Lake Erie & Western road ran into the rear of a coal train which had stopped on the main track near Hawley, Pa., wrecking several cars. The coal train, it is said, had no signal out.

On the night of the 27th a freight train on the Cincinnati, Lafayette & Chicago road broke in two near Earl Park, Ind., and the rear section afterward ran into the forward one, wrecking seven loaded cars and damaging some others.

On the morning of the 28th a coal train on the New York, Lake Erie & Western road broke in two near Vail's Gate, N. Y., and the rear section ran into the forward one, wrecking six cars and blocking the road several hours. A brakeman was hurt.

BUTTING COLLISIONS.

On the morning of the 1st a passenger train on the Pittsburgh, Fort Wayne & Chicago road ran over a misplaced switch and into the head of a freight train at Valparaiso, Ind. Both engines were wrecked, one engineer killed, the other fatally hurt, and a fireman less severely injured.

On the 1st a freight train on the Pennsylvania Railroad broke in two near Altoona, Pa., and the detached cars ran back down the grade and into the head of a following freight, doing some damage and injuring two train-men.

On the 3d there was a butting collision between two freight trains on the Central Vermont road near Stanbridge, P. Q., doing some damage.

Very early on the morning of the 4th there was a butting collision between two freight trains on the Pennsylvania Railroad, at Frankford Junction, Pa., by which both engines and several cars were wrecked. The wreck caught fire and was partly burned up. A fireman was killed and an engineer badly hurt.

On the night of the 4th there was a butting collision between a passenger and a freight train on the Vandalia Line, near East St. Louis, Ill. Both engines and several cars were wrecked, an engineer and a fireman killed. Two clerks in the postal car were hurt. The freight was switching and had sent out a signal, but the passenger train failed to see it on account of a dens fog.

On the morning of the 6th there was a butting collision between a passenger and an extra freight train on the Intercolonial road, near Athol, N. S. Both engines and several cars were wrecked, one engineer killed, the other with a conductor and both firemen, badly hurt. The accident was caused by a mistake in understanding train orders.

On the morning of the 8th a coal train on the New York, Lake Erie & Western road broke in two near Passaic, N. J. A following train picked up the rear section and pushed it ahead some distance, finally running into the forward section which was then running backward to find the dropped cars. Both trains were running at considerable speed, and 13 coal cars were piled up together and wrecked.

On the afternoon of the 11th there was a butting collision between a freight train and a wild engine on the Troy & Boston road, near Hoosick Junction, N. Y. Both locomotives were badly damaged.

On the morning of the 17th there was a butting collision between two freight trains on the Northern Central road near New Cumberland, Pa. Both engines were badly wrecked and 30 cars thrown down a bank, eight of them going into the Susquehanna. A fireman and a conductor were very badly hurt.

About noon on the 25th there was a butting collision between two passenger trains on the New York Elevated road near the Forty-second street station in New York. Both engines and two cars were damaged, and five persons slightly hurt. The accident was caused by a misplaced switch.

UNEXPLAINED COLLISION.

On the morning of the 5th there was a collision between two freight trains at the junction of the Marietta & Cincinnati and the Cincinnati Hamilton & Dayton roads in Cincinnati, O. Several cars were wrecked and the track blocked some hours. There was a thick fog at the time.

DERAILMENTS, BROKEN RAIL.

On the 1st some cars of a freight train on the Connecticut Central road were thrown from the track at Longmeadow, Mass., by the breaking of a rail.

On the 1st, a freight train on the Connecticut Valley road struck a broken rail near Middletown, Conn., and the tender and 18 cars were thrown from the track, nearly all of them going down a bank and out upon the frozen river. Most of the cars were wrecked.

On the 4th a freight train on the Whitby & Port Perry road struck a broken rail near Myrtle, Ont., and nine cars were thrown from the track and went down a high bank. The cars were wrecked and three train-men badly hurt.

On the night of the 4th nine cars of a freight train on the Grand Rapids & Indiana road were thrown from the track by a broken rail near Valentine, Ind., doing some damage.

On the 6th the engine of a freight train on the Burlington & Lamoille road was thrown from the track at Essex Junction, Vt., by a broken rail.

Early on the morning of the 10th a freight train on the New York Central & Hudson River road struck a broken rail near Green's Corners, N. Y., and ten cars were thrown from the track, two of them rolling over the bank. The road was blocked five hours.

On the morning of the 15th two cars of a freight train on the Winona & St. Peter road were thrown from the track near Owatonna, Minn., by a broken rail. The caboose rolled down a high bank, injuring eight men who were in it.

On the 15th, the sleeping car of a passenger train on the Chicago, St. Louis & New Orleans road was thrown from the track by a broken rail, at Abbeville, Miss., and badly damaged, injuring four passengess.

DERAILMENT, BROKEN WHEEL.

On the 28th a passenger train on the Carolina Central road was thrown from the track by a broken wheel near Peedee, N. C., wrecking several cars, killing a brakeman and injuring three passengers.

DERAILMENT, BROKEN AXLE.

On the morning of the 7th 16 cars of a freight train on the Pennsylvania Railroad were thrown from the track near Marietta, Pa., by the breaking of an axle, and four of them were wrecked.

DERAILMENTS, BROKEN TRUCK.

Early on the morning of the 10th five cars of a freight train on the New York Central & Hudson River road were thrown from the track at Spraker's Basin, N. Y., by the breaking of a truck.

On the morning of the 17th six cars of a freight train on the Long Island road were thrown from the track near West Deerpark, N. Y., by the breaking of a truck. Some of the cars were badly broken and the road blocked four hours.

DERAILMENT, LOOSE WHEEL.

On the 3d the mail car of an express train on the New York, Lake Erie & Western road jumped the track near Greycourt, N. Y., delaying the train a short time. The accident was caused by a loose wheel.

DERAILMENT, LAND-SLIDE.

On the morning of the 31st a passenger train on the Lehigh Valley road ran into a land-slide near Mill Creek, Pa., and the engine was thrown from the track and badly broken, killing the engineer and injuring the fireman. The engineer was caught under the wreck and held so that he could not be taken out without lifting the engine; he suffered terribly for a time until he died.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

Very early on the morning of the 28th six cars of a freight train on the Cleveland, Columbus, Cincinnati & Indianapolis road were thrown from the track near Harrisville, Ind., by a brake-beam which dropped down on the track and caught in a frog.

On the night of the 28th a passenger train on the Boston & Albany road struck a large rock which had rolled upon the track in a cut near Russell, Mass., throwing the engine from the track, damaging it slightly, and delaying the train an hour.

DERAILMENT, CATTLE.

On the night of the 28th a freight train on the International & Great Northern road ran over some cattle near Rockdale, Tex., and the engine and two cars were thrown from the track and wrecked, blocking the road 12 hours.

DERAILMENTS, SPREADING OF RAILS.

On the 12th, several cars of a freight train on the Pittsburgh, New Castle & Lake Erie road, were thrown from the track near Economy, Pa., by the spreading of the rails.

On the 13th, a car in a passenger train on the Kendall & Eldred road was thrown from the track near Rixford, N. Y., by the spreading of the rails.

DERAILMENTS, MISPLACED SWITCH.

About noon on the 5th, a standard-gauge freight train on the New York, Lake Erie & Western road ran over a misplaced switch at Hackensack Junction, N. J., and upon the track of the New Jersey & New York road, where no third rail is laid. Nearly the whole train left the track, and the road was blocked some time. A standard-guage train will not run smoothly on 6 ft. gauge tracks.

On the morning of the 20th, some coal cars which were being pushed through Trenton, N. J., on the Pennsylvania Railroad track, were thrown from the track by a misplaced switch. A brakeman was thrown down between two cars and killed.

On the morning of the 31st a freight train on the Missouri Pacific road was thrown from the track in Leavenworth, Kan., by a misplaced switch.

DERAILMENTS WITH MALICIOUS INTENT.

On the evening of the 22d the engine of a coal train on the Pittsburgh Southern road was thrown from the track near Banksville, Pa., by obstructions supposed to have been placed on the track by striking miners.

On the evening of the 24th a passenger train on the Pittsburgh Southern road was thrown from the track near Banksville, Pa., by obstructions placed on the track by striking miners.

On the night of the 29th a passenger train on the Grand Trunk road was thrown from the track near Smith's Creek, Mich., where a rail had been removed from the track by train-wreckers. The engine and several cars were wrecked, the fireman and a brakeman killed, the engineer fatally injured and six passengers hurt.

DERAILMENTS, UNEXPLAINED AND MISCELLANEOUS.

On the morning of the 1st a Pullman car in a passenger train on the Pittsburgh, Fort Wayne & Chicago road ran off the track near Salem, O. One man was hurt.

On the afternoon of the 3d four cars of a freight train on the New York Central & Hudson River road ran off the track in Rome, N. Y., blocking the road an hour.

On the afternoon of the 5th a local passenger train on the Central Pacific road ran off the track near Berkeley, Cal., and the engine upset into the mud.

On the night of the 13th eight cars of a freight train on the Fitchburg road were thrown from the track near Gardner, Mass.

On the 14th a passenger train on the Kendall & Eldred road ran off the track in Bradford, Pa.

On the evening of the 17th some cars of a passenger train on the Ashuelot road ran off the track near Westport, N. H.

On the morning of the 19th a shifting engine on the Delaware Western road ran off the track and upset in Wilmington, Del.

On the 22d some cars of a freight train on the Philadelphia & Erie road were thrown from the track near Farrandsville, Pa. The wreck caught fire from an oil tank, and 13 cars were burned up.

On the morning of the 22d the engine and two cars of a freight train on the Penn sylvania Railroad ran off the track near Blairsville Intersection, Pa., blocking one track several hours.

On the night of the 23d the engine and four cars of a passenger train on the New York, Lake Erie & Western road were thrown from the track near Otisville, N. Y.

On the morning of the 26th three cars of a freight train on the New York, Lake Erie & Western road ran off the track near Pond Eddy, N. Y., causing some delay of trains.

On the afternoon of the 27th six cars of a freight train on the Connecticut River road were thrown from the track in a deep cut near Greenfield, Mass., making a wreck very hard to remove, and blocking the road nearly all night. A brakeman was slightly hurt.

On the night of the 28th a passenger train on the Connecticut & Passumpsic Rivers road was thrown from the track near Coventry, Vt., and two cars ran down a bank, but only slight damage was done.

BOILER EXPLOSION.

On the evening of the 8th the engine of a freight train on the Buffalo, New York & Philadelphia road exploded its boiler at Ebenezer, N. Y., wrecking the engine and injuring the engineer and fireman badly.

OTHER ACCIDENT

Early on the morning of the 16th a car loaded with cotton in a freight train on the New York Central & Hudson River road caught fire near St. Johnsville, N. Y., and was destroyed.

This is a total of 61 accidents, whereby 14 persons were killed and 50 injured. Nine accidents caused the death of one or more persons each; 12 caused injuries, but not death, while in 40, or 65.6 per cent. of the whole number, there was no injury serious enough for record.

As compared with March, 1878, there was an increase of 12 accidents, of 9 in the number killed, and of 36 in that wounded.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:		
Rear collisions	11	
Butting collisions	9	
Unexplained collision	1	
		— 21
DERAILMENTS:		
Unexplained	13	
Broken rail	8	
Broken wheel	1	
Broken axle	1	
Broken truck	2	
Loose wheel	1	
Land-slide	1	
Accidental obstruction	2	
Cattle on track	1	
Spreading of rails	2	
Misplaced switch	3	
Malicious obstruction	2	
Rail removed purposely	1	
		— 38
Boiler explosion	1	
Car burned while running	1	
Total		61

Four collisions were caused by trains breaking in two; two by failure to send out signals; two by misplaced switches; two by fog, and one by a misunderstanding of train orders. Twenty-one accidents were caused directly by defects or failures of road or equipment.

The division of accidents and casualties according to classes of trains was as follows:

Accidents:	Collisions.	Derailments.	Other accidents.	Total.
To passenger trains	1	14	..	15
To a passenger and a freight	5	..	..	5
To freight trains	15	24	2	41
Total	21	38	2	61
Casualties:				
Killed by	8	6	..	14
Injured by	21	27	2	50
Total	29	33	2	64

March showed a somewhat larger proportion of collisions than usual and butting collisions were especially numerous. On some roads there was an unusual press of traffic, but these are not especially prominent in the record of collisions, and there is no apparent reason for a greater number than ordinary. Broken rails appear in large numbers—more than one-eighth of the whole—and it may be noted that all of them were in the first half of the month. Other breakages of iron are not many in number, and there is no broken bridge in the record. Misplaced switches caused five accidents—three derailments and two collisions—and the number does not seem to decrease from month to month. Three malicious derailments, two by obstructions and one by the removal of a rail are not pleasant features of the month.

For the year ending with March the record is as follows:

	No. of accidents.	Killed.	Injured.
April	46	12	55
May	50	13	44
June	56	12	58
July	54	7	41
August	75	36	108
September	76	22	53
October	61	35	163
November	68	15	54
December	63	16	58
January	113	23	90
February	88	11	75
March	61	14	50
Totals	811	216	849
Totals, same year, 1877–78	821	220	949

The averages per day for the month were 1.97 accidents 0.45 killed, and 1.61 injured; for the year they were 2.22 accidents, 0.58 killed and 2.33 injured. The average casualties per accident were for the month, 0.230 killed and 0.820 injured; for the year, 0.266 killed and 1.047 injured. The month is below the average of the year both in numbers and in the proportion of casualties.

Passenger Cars for the Metropolitan Elevated Railroad.

The engravings published this week complete the series of illustrations of these cars, which have been so much admired by all the passengers on the Metropolitan road.

The drawings leave very little to be said in explanation. The following description is taken chiefly from one published nearly a year ago, when the cars were first placed on the road:

The bodies are 37 ft. 10 in. long by 8 ft. 9 in. wide. The trucks have paper wheels 28 in. in diameter spread 5 feet, and the distance from the centre of one truck to the centre of the other is 30 feet. The outside of the bodies and trucks is painted a peculiar light green color which is hard to describe. The projecting parts between the panels and windows are painted a darker shade of the same color, and the chamfered edges are painted maroon. The striping and ornamentation are done in a deep shade of green and gold. The painting gives them a very attractive and airy appearance.

The doors and platforms are similar to those in use in ordinary American cars, but the seats are arranged somewhat differently, as shown in fig. 3, published last week. In the centre of the car there are eight transverse seats of the ordinary kind, excepting that they are not reversible, arranged exactly as they are in a sleeping car when used for day travel. The space occupied by these seats would correspond to four sections of a sleeping car, that is, two on each side of a central aisle. These seats are about five feet from centre to centre, so that it leaves a space of thirteen and a half feet at each end of the car. In these spaces the seats are arranged longitudinally on each side of the car. These, the public will be gratified to learn, are divided into spaces each 19 in. square. The divisions are made of a neat pedestal casting of malleable iron, with a cylindrical mahogany arm rest attached to the top. Its height is not sufficient to prevent ladies' dresses from falling over it, and yet it is quite enough to separate one seat from another, and thus prevent the indecent crowding now so common in horse cars. The effect of this arrangement is that it divides the car in the centre, and will thus lead the passengers at each end to go out at the door nearest to them. The longitudinal seats at each end will accommodate 16 passengers, and in the centre there is room for an equal number, so that the cars will seat altogether 48 passengers. The seats are upholstered with Cobb's springs, with cushions stuffed with a species of felt, and covered with maroon-colored morocco. The backs are covered with the same material. The arrangement and construction of the seats seem to be all that could be desired, and certainly provide an amount of comfort and elegance in a public conveyance to which the people in New York have heretofore been strangers.

The arrangement of the windows is somewhat peculiar. In the centre of the car, on each side, is one large one, with an opening 39⅛ × 44 in. On each side of these are twin windows, each 19⅛ × 44. At each end, and on each side of the car, are two more large ones, 35⅛ × 44 in., with single small ones between, of the same size as the twin windows. The space between these is simply the post, so that the whole side of the car is glazed, and, therefore, the whole car is unusually light and cheerful. Curtains of several different plain patterns are hung on spring rollers, which are placed inside the cornice over the windows. One of these is a very neat plaid, or checker-board, pattern, of two shades of tan color. The lower edges of the curtains are trimmed with morocco of the same color as the covering of the seats, and with an iron bar worked in as a weight to the curtain.

The clear-story extends from one end to the other of the car body, and has windows glazed with ground glass; the openings being covered with wire-cloth outside. The sashes are pivoted at their lower edge, in a very ingenious and simple way. Instead of having ordinary fixed pivots, common car sash-locks are used, the bolt of which forms the pivot. By simply withdrawing these bolts the whole sash can be removed in an instant to be cleaned, or for any other purpose.

The ceilings of the cars, instead of being covered with the ordinary head-lining, are finished with oak panels, the divisions of which, and all the other wood work, are of mahogany. The panels are decorated in what some one has called the "modern gothic" style. The decorations consist of flowers, plants and arabesques, painted on the panel, as shown in fig. 4 The designs vary, however, and of course only one of these is shown in the engraving.

This is very beautiful, and the whole interior decoration, while it is quite simple, is in excellent taste.

The bell-cords are carried in rings along either side of the clear-story, and the end doors each have a sliding sash for ventilation, with a suitable door-holder to keep the door open.

The first-class cars are carpeted with Axminster carpet in the centre, and with rugs made of the same material at each end.

The heating apparatus is not shown in the engravings, but consists of a longitudinal pipe under the seats on each side of the car, and was manufactured by the American Car-Heating & Brake Co., of Albion, N. Y.

Each of the cars has three gilt lamps, manufactured by Messrs. Hicks & Smith, of New York. These have each two dual burners, which are protected from being blown out by being entirely closed up around the burner, the air for combustion being admitted through a central opening, and the top of each chimney is protected from downward and side drafts by a peculiar jack, whose construction could not be described so as to be understood without an engraving.

It should be added that about 200 of the cars on the Metropolitan road and 150 on the New York Elevated Railroad are furnished with the rattan-covered seats and seat backs manufactured by the Wakefield Rattan Company of Boston. These are very popular, especially in summer.

The platforms at each end extend 3 ft. 6 in. beyond the car body, and are inclosed in a railing of beautiful design and made to correspond in style to the decoration of the car. The sides of the platforms are inclosed by gates, and these are held either open or shut by a spring placed underneath the floor. It is intended to connect the gates at each end of the car together, so that a brakeman at one end will open those at each end at the same time.

The running gear consists of two four-wheeled trucks, shown in the engravings in this number, with 28-in. paper wheels. These have wooden frames with six elliptic body

Fig. 6.—Inverted Plan of Draw Gear.

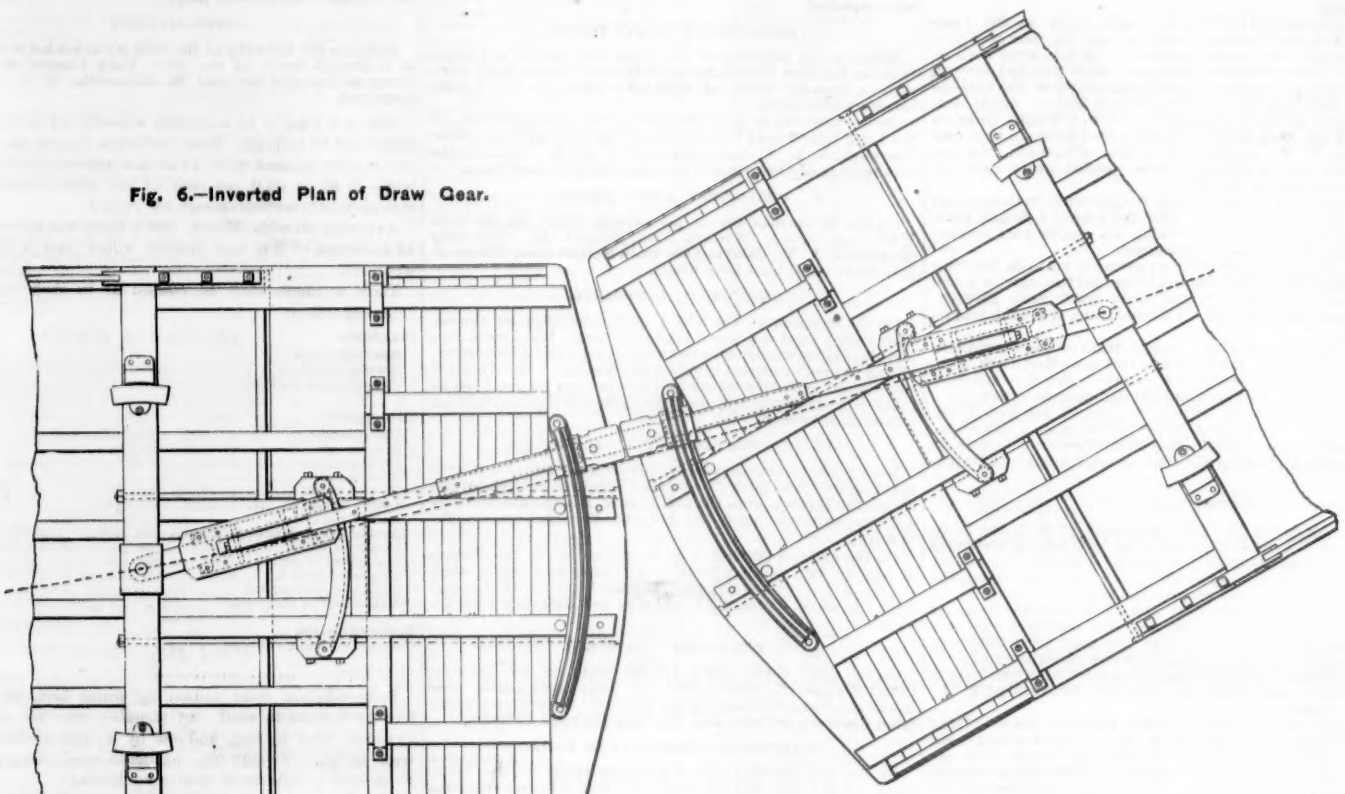


Fig. 7.—Longitudinal Section of Draw-Bar.

DRAW-GEAR OF CARS FOR METROPOLITAN ELEVATED RAILROAD.

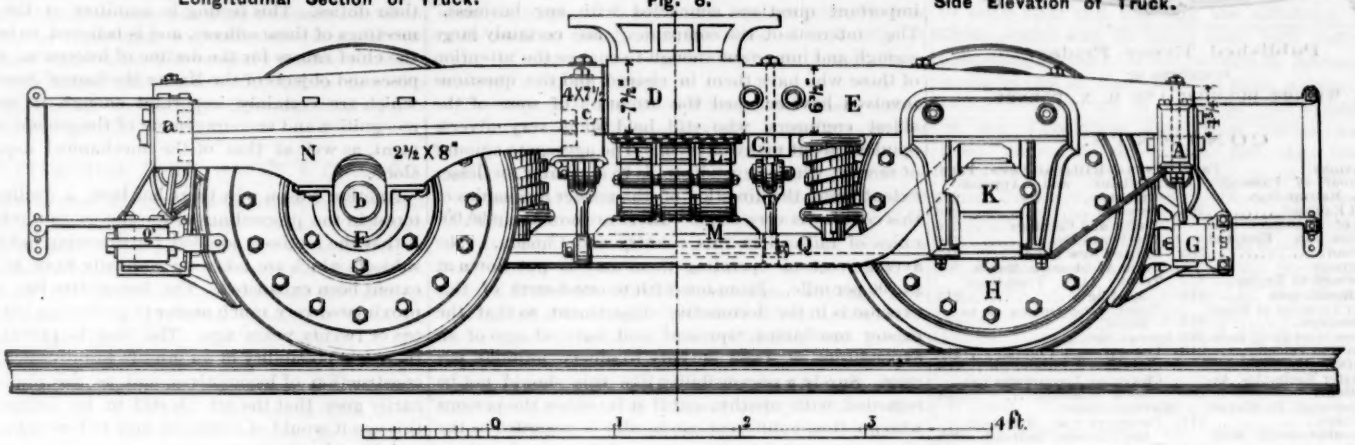
The cars are all equipped with Eames' vacuum brake

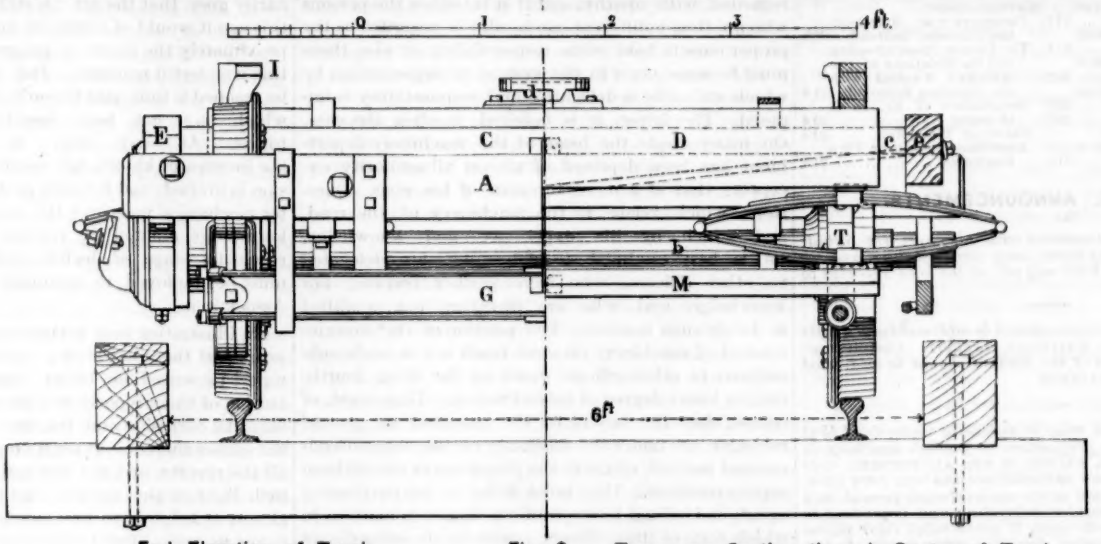
which is not shown in the engravings. This may be described as consisting of a large cast-iron bowl, which is fastened to the truck transoms and covered with a rubber diaphragm. The air is exhausted from this bowl, and, as the diaphragm

The cars were designed and built at the shops of the Pullman Palace Car Company, in Detroit, and are fine specimens of the excellent work which is done in this company's workshops.

brakes. On examination it was found that the bridge had been broken by two heavy locomotives which passed over it the night before, and if the train had not been stopped just in time it must inevitably have gone down. The passengers were carried by.—*Keene (N. H.) Republican.*

Longitudinal Section of Truck. Fig. 8. Side Elevation of Truck.





End Elevation of Truck. Fig. 9. Transverse Section through Centre of Truck.

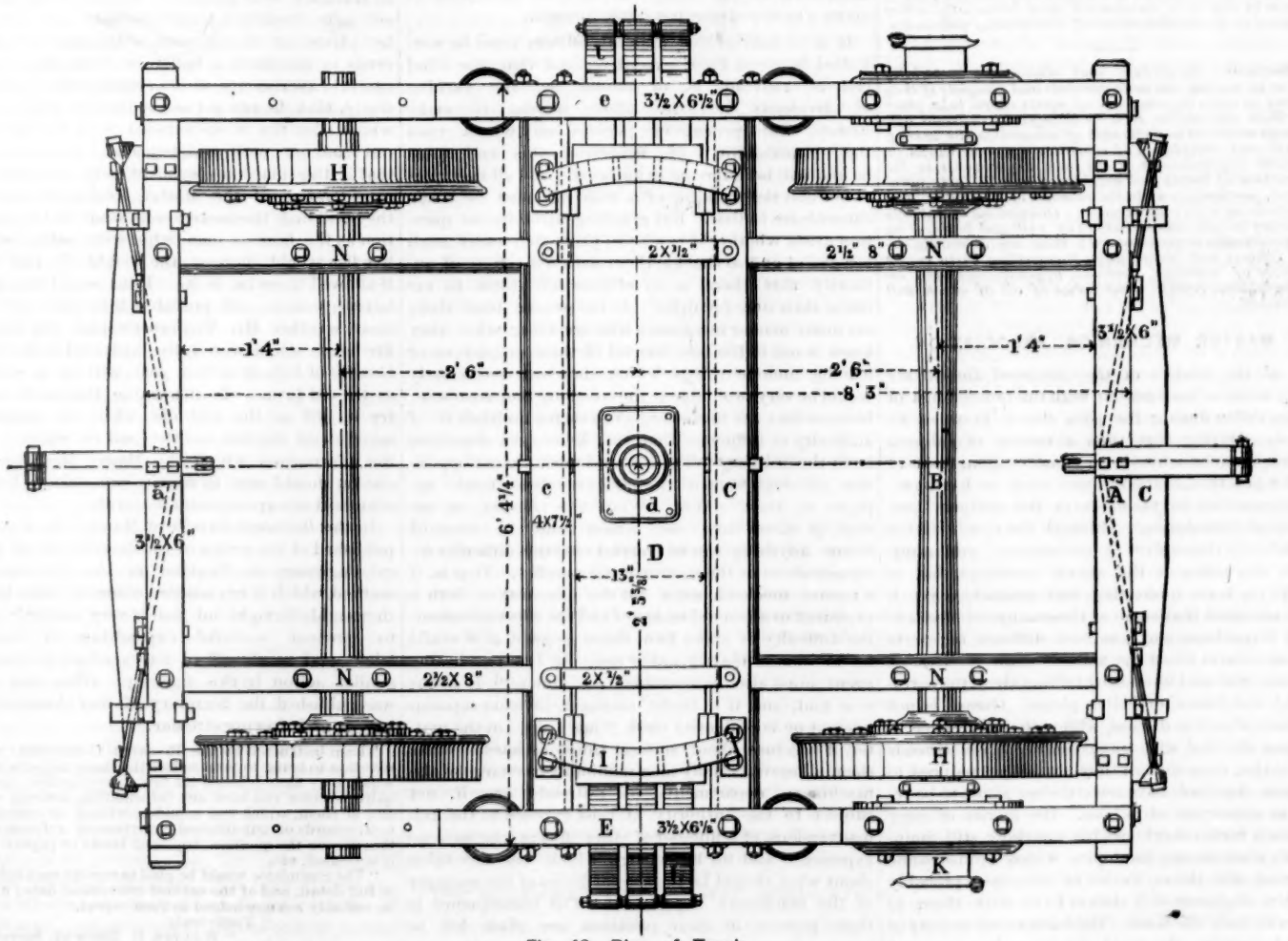


Fig. 10.—Plan of Truck.

TRUCK OF PASSENGER CARS OF METROPOLITAN ELEVATED RAILROAD.

is connected with the brake levers, when the air is exhausted the brakes are applied.

Altogether the cars are very skillfully designed, if regarded either from a mechanical or esthetic point of view. Their weight is estimated at 22,000 lbs., or 458⅓ lbs., per passenger.

Narrow Escape.

On Thursday of last week, as the Passumpsic express passenger train over the Southeastern road approached within a few rods of the dry bridge near North Troy, a single span bridge, 80 feet long, and about the same height from the bottom of the rocky chasm its span, the engineer thought he saw something wrong with the bridge, and applied the air

The Catalpa Tree.

The Terre Haute (Ind.) *Express* states, on the authority of Road-Master Mills, that the Evansville & Terre Haute Company is going to plant a large number of catalpa trees for its own future use, officers of the road being convinced that the timber of the tree has the advantages claimed for it by Mr. E. E. Barney, who has so long advocated its use.

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE MASTER MECHANICS' ASSOCIATION.

Most of the readers of the *Railroad Gazette* are probably more or less familiar with the proceedings of this Association during the past eleven years of its existence. During that time a variety of subjects have been brought before it for consideration, most of them of a practical character, and such as have presented themselves to members in the ordinary performance of their duties. Although the consideration of the subjects themselves by committees, and afterward by discussion at the annual meetings, has, in many ways, been interesting and profitable, yet it must be admitted that some of these subjects begin to be worn threadbare, and it is now difficult to excite much enthusiasm about the annual wear of tires, or inspire any profound interest by talking about the corrosion and endurance of boiler plates. Grease is not a thrilling subject to discuss, although its absence is sometimes attended with tragic results. Screw-threads and car-axles, even though they are not yet reduced to a common standard, have nevertheless come to be regarded as somewhat of a bore. The merits of long steam-ports *versus* short ones has somehow still maintained its place among the topics which arouse some excitement, and the mysteries of valve-gear probably locomotive engineers will always have with them to while away their idle hours. The habitual unveracity of mankind regarding the speed of a horse has extended to the performance of locomotives, so that reports and debates on this latter subject are generally received with some skepticism. It must, in short, be admitted that there are indications of general weariness of these subjects and the methods of discussing them. The precise cause of this is a little difficult to point out. If we refer to the preamble to the constitution of the Association, it will be seen that the founders of it stated their object as follows: "We believe that the interests of the companies by whom we are employed may be advanced by the organization of an association which will enable us to exchange information upon the many important questions connected with our business." The "interests of the companies" are certainly large enough and important enough to engage the attention of those who have them in charge, and the questions involved have engaged the attention of some of the ablest engineers, who still hold some very diverse opinions about many of them. The aggregate amount of money, whose expenditure is to a greater or lesser extent under the direction of the master mechanics of this country is very large. There are now about 90,000 miles of railroad in this country and Canada. The average cost of operating them may be put down at $4,000 per mile. From one-fifth to one-fourth of this expense is in the locomotive department, so that the master mechanics represent and have charge of an expenditure of from seventy to ninety millions per year. Surely a responsibility like this should not be regarded with apathy, and if it is, either the persons who are thus indifferent can hardly be regarded as the proper ones to hold such responsibility or else there must be some error in the system of organization by which authority is delegated and responsibility is imposed. The latter, it is believed, is often the case. On many roads the head of the machinery department has been deprived of almost all authority, excepting that of a mere foreman of his men. Questions which relate to the machinery of the road, and which, by his experience and knowledge, he is best qualified to determine, are delegated to other officers, who have neither training nor knowledge, and who are *therefore* not qualified to decide such matters. The position of the superintendent of machinery on some roads is now made subordinate to other officers down to the third, fourth, fifth or lower degree of subordination. They must, of course, obey the orders of the president or general manager, are under the authority of the superintendent and subject, often, to the directions of the division superintendents. They must defer to the purchasing agent, and submit to the traffic manager in matters in which none of these officers, especially the subordinate ones, are nearly as competent to form an intelligent opinion as the master mechanic himself.

It is of course true that all officers must be controlled by some chief executive, and that the chief end of railroads is, or should be, the earning of dividends, or, in other words, to make money. The person or persons on whom rests the responsibility of achieving this end must be and will be supreme in authority, and all the operations and the working of a railroad must be made subordinate to that. But granting all this, the question arises whether it is wise to place men under such constraint and so shackle them with a diversity of authority that there is no chance left them to exercise their own faculties. At the present time there are many master mechanics who are doing what they know is not to the best interest of their employers, or leaving undone things which they can see clearly would be very profitable to the company they represent, because they are made subject to such a multiplicity of authority or influence that they know any departure from the ordinary practice would meet violent opposition, although some of the superior officers might approve of their action. When the consent, or assent, of more than one person must be obtained before anything can be carried out, the difficulty increases about as the square of the number. That is, if a master mechanic must get the approval of both a president or a general manager and the superintendent, the difficulty is about four times as great as it would be to obtain that of either one. If the purchasing agent must also be consulted, the difficulty is about nine fold, and if a traffic manager, division superintendent or confidential clerk "has a say" in the matter, it becomes about sixteen times as hard to make them all agree. Many men nominally in charge of the machinery departments of railroads are, if not subject to the authority, at least exposed to the animadversions, of a number of other officers who have no experience and no knowledge which has any value about what should be the special duties of the manager of the machinery department. The consequence is that persons in such positions are often led to devote more care and skill to carrying on their work, so as to conciliate the diverse opinions and interests which they find to have the privilege of inserting fingers into the pie, of which they alone should be the *chefs*, than to the actual performance of their duties. Their great effort thus is to get along smoothly, and do what these perhaps diverse authorities will agree in thinking right, and not what they know to be best. The evil which is referred to is, that the authority which is exercised over the machinery department on many roads is too much divided, and for this reason the nominal heads lose all pride and feeling of responsibility in the performance of their duties. This feeling is manifest at the annual meetings of these officers, and is believed to be one of the chief causes for the decline of interest in the purposes and objects of the Master Mechanics' Association, which are certainly important enough to merit the recognition and encouragement of the general management, as well as that of the mechanical department alone.

Another reason why there has been a decline in interest in the proceedings of the Association referred to is that the methods adopted for throwing light on the subjects which are taken up annually have to a great extent been exhausted. The locomotive has now approximated very much nearer to perfection than it was ten or twenty years ago. The idea is prevalent that there is a possibility of an infinite improvement in the construction of locomotives, and as the phrase ordinarily goes, that the art "is still in its infancy." At this age it would of course be rash to forecast even approximately the limits of progress or development of this wonderful machine. But that such a limit may be reached is indicated by such instruments as a violin, which has not been improved at all for centuries. At any rate, it seems clear that the increase of knowledge resulting from *mere* discussion is limited, and it seems probably that at the master mechanics' meetings the amount and value of the knowledge elicited by reports and discussions has reached a stage of decline, and that other methods must be employed to maintain the usefulness of the Association.

An illustration may perhaps make this clearer. For years past there has been a committee appointed and a report presented on boiler construction. The chief burden of these reports and the discussions thereon has been the corrosion and fracture of fire-box plates and the causes thereof. It must be confessed, though, that all the reports and the discussions have thrown very little light on the subject, and that at present we are almost as helpless to prevent the destruction of fire-boxes as ever. But now comes a man from away off in Hungary who conceives the idea that the water-spaces in fire-boxes are unnecessary, and that the fire-box plates can be dispensed with, and forthwith proceeds to construct a boiler on that plan, and after careful experiments shows, apparently quite conclusively, that he can get as good results with a boiler in which the fire is surrounded with fire-brick, as he can from one with water-spaces. It is evident now that if this man's experiments are presented to the consideration of the Master Mechanics' Convention they will find themselves somewhat in the same position as the famous men who were asked whether a live fish would increase the weight of a pail of water if allowed to swim in it. Talk would not settle the latter question, and probably talk will not make it clear whether Mr. Verderber's plan for locomotive fire-boxes, which were fully illustrated in the *Railroad Gazette* of Feb. 28 of this year, will be as economical as the old form. To determine this some one must try it, just as the fool did when the question was asked about the fish and the pail of water. Much of the information which the Master Mechanics' Association should aim to acquire can only be learned by some sort of experimental research.

In the *Railroad Gazette* of March 7 an account was published of the action of the Institution of Mechanical Engineers in England in this direction. The method which it has adopted seems to have been very thoroughly thought out, and is very carefully guarded to prevent wasteful expenditure of money or labor, and would afford an excellent precedent for similar action in this country. Since that account was published, the Secretary of that Association has issued the following circular:

"I am instructed by the Research Committee of the Institution to bring to your notice the three subjects (as below) which they have selected for first investigation; and to inquire whether you have any information, bearing on all or any of them, which you would be willing to communicate, *e. g.*, records of unpublished experiments, references to authorities on the question, copies of books or papers in which it is treated, etc.

"The committee would be glad to receive such information in full detail, and at the earliest convenient date; and it will be suitably acknowledged in their report.

"Yours truly,

"WALTER R. BROWNE, Secretary.

"10 Victoria Chambers, Victoria street, Westminster, March, 1879.

"Subject A. The hardening, tempering and annealing of steel.

"Subject B. The best form of riveted joints to resist strain, in iron or steel, or in combination.

"Subject C. Friction at high velocities, specially with reference to friction of bearings and pivots, friction of brakes, etc."

The Western Railroad Association has also announced that it will have special examinations and

reports made of the value of new inventions. The circular announcing this action and the rules adopted to govern such investigations were published in the *Railroad Gazette* of March 28 last.

It would seem to be very desirable that there should be some coöperation between these two associations in some plan for conducting experimental research. Of the value of such research, if properly conducted, there can be little doubt, and that it would infuse new life and interest in one or both of these associations also seems equally certain.

THE PITTSBURGH, FORT WAYNE & CHICAGO.

The lowest cost per ton per mile seems to have been reached on the Pittsburgh, Fort Wayne & Chicago Railway in 1878. We say "seems," because freight and passenger expenses are not reported separately. But even if the proportion of expenses to earnings were the same for freight as for passengers, it would still have nearly the lowest rate yet reported—0.4653 cent per ton per mile. But at this rate the passenger expense would be but 1.208 cent, which is lower than is reported on any American road, and a fifth lower than on the United Jersey roads, where the cost is reported lower than on any other division of the Pennsylvania Railroad. If the Fort Wayne's passenger expenses were as high as the average of the Pennsylvania's roads east of Pittsburgh and Erie, then its expenses per ton per mile were but 0.387 cent per ton per mile. Very few roads in the country are so well situated to show light expenses per unit of work, not because it is so easy to work, for it is not, but because it has an enormous through traffic *and is all main line.* This latter makes a vast difference. The "Main Line and Branches" of the Pennsylvania Railroad is two-thirds branches, and the average earnings of the branches are not *one-fifteenth* those of the main line, and their average expense per ton per mile may easily be two or three or four times as great as the corresponding expenses on the main line, thus bringing up materially the average expense. So with the Lake Shore, the Erie, and the New York Central. The expense per unit of traffic shown in their reports must in all cases exceed considerably the expense on the main line. The Canada Southern and the Union Pacific alone among roads with a considerable traffic are in this respect similar to the Fort Wayne. The Canada Southern has the further advantage (for showing a low average expense, *not* for rendering a large profit) of a traffic which is almost entirely through; but we have no reports from it as yet.

It is due to this low average expense that the Fort Wayne road is one of the most profitable in the country—the most profitable of lines so far west; for its average rates are lower than on any of the trunk lines —2.275 cents per passenger-mile and 0.88 cent per ton-mile in 1878. In this it shares the fate of the parallel roads which connect the trunk lines with the Northwest, and which, for a very large share of their through traffic, have to compete with the lake vessels, which commonly carry for less than ocean rates. The Fort Wayne, however, has the advantage of being the shortest of these lines; and so of getting the highest rate per mile out of the same through rate. Thus, while it was getting 0.88 cent per ton per mile, the Atlantic & Great Western received but 0.836, and the Cleveland, Columbus, Cincinnati & Indianapolis 0.752 cent. The difference between this latter rate and the Fort Wayne's alone amounts to a difference of $800,000 in the net profits of the latter road.

This is the one especially valuable acquisition of the Pennsylvania Railroad Company out of its numerous leases. Although what was esteemed a high rental is paid for it (the interest on the debt and 12 per cent. on the stock outstanding at the time of the lease), it has always returned a large profit to the lessee above the rental, without considering the value of the enormous traffic which it secures to the lessee's own road east of Pittsburgh. In 1878 this profit amounted to $827,000, which is equivalent to 3¼ per cent. on the stock. And this is the only one of the lines connecting the trunk lines with the Northwest that has maintained its rate of profits and dividends. The Michigan Central paid no dividends for several years. The Lake Shore greatly reduced its rate of dividend. The lines further south did not always earn the interest on their bonds. The Fort Wayne's net earnings in 1878 have been exceeded but twice in its history, in 1871 and 1872, when gold was at a premium of more than 10 per cent. The reports of expenses are not sufficiently full to indicate how well the road has been maintained; but, taking the whole period together, it must have been well maintained, as a very few years of even slight negligence would have brought it into such condition that it could not be worked economically. There has been, it is true, considerable charges to construction account meanwhile, amounting since 1872 to $3,133,000, or $6,500 per mile of road. But meanwhile there have been material improvements to the road, though it is still (notwithstanding its great traffic and earnings) mainly a single-track road, and had considerable iron in its track a year ago. At the close of 1877 only 58 miles of second track were reported, though there were 142 miles of sidings.

The only other one of the Pennsylvania lines west of Pittsburgh and Erie which yields a profit over the rental or guaranteed interest is the Pittsburgh, Cincinnati & St. Louis proper—that is, the 193 miles from Pittsburgh to Columbus. The numerous lines leased to the last-named company, and the other lines west of Pittsburgh controlled by the Pennsylvania, all net a loss, except the unimportant lines whose rental is limited to the amount of net earnings. The aggregate loss on the Pittsburgh, Cincinnati & St. Louis lines, however, was small in 1878 ($140,000), and greatly overbalanced by the profit on the Fort Wayne lease. The net earnings of the Erie & Pittsburgh were $157,602, the payments for interest and guaranteed dividends, $375,040. The net earnings of the Columbus, Chicago & Indiana Central were $700,000 less than the interest on the bonds, which the Pennsylvania was to pay by the terms of the lease (but does not, however, there being a suit pending concerning the obligation). The Little Miami rental exceeded the net earnings by $363,250; that of the Jeffersonville, Madison & Indianapolis by about $70,000. There was a loss of $83,000 in connection with the Cincinnati & Muskingum Valley, one of $65,200 on the Vandalia line, one of $200,000 on the Indianapolis & Vincennes, and one of $385,000 on the Indianapolis & St. Louis, of which about $140,000, we believe, is chargeable to other roads, and does not have to be borne, directly or indirectly, by the Pennsylvania Railroad Company.

It is noticeable that the road leased at the highest rental, and, moreover, at a fixed rental (not affected by the amount of earnings) has been the only one that has been directly profitable. When the lease was made it seemed a high price to pay—12 per cent. on a stock that not very long before had made no returns, and was supposed to be doing extremely well when it paid 10 per cent. Just before, the Columbus, Chicago & Indiana Central had been leased for 30 per cent. of the gross earnings, with the stipulation that it should always equal the interest on $15,821,000 of the bonds of the company. By the latter lease connections with Chicago, Indianapolis, St. Louis and Louisville were assured at a minimum rental of $1,107,470 for 580 miles of road. By the former, about $2,592,000 were to be paid for the use of the 468 miles from Pittsburgh to Chicago. Yet in 1878 we find a profit of $827,000 on the Fort Wayne lease and loss (by the terms of the lease) of $700,000 on the Columbus lease, which then seemed made on the easiest terms. The question now pending as to the obligation of the Pennsylvania to provide for the interest on the $15,821,000 of Columbus bonds has nothing to do with this. There is no contest but that the intention was to pay this interest, and the ground for refusal is an alleged neglect of the lessor company to fulfill its part of the contract.

It is, however, doubtless true that the lease of the Columbus road made it easier to get possession of the Fort Wayne, which needed the Pennsylvania almost as much as the Pennsylvania needed it; and, moreover, it is also doubtless true that if the Pennsylvania had not got the Fort Wayne road, but had had to depend on the Columbus road for its Chicago connection, the latter would now have, and would have had ever since the lease, a very much greater traffic than it has actually enjoyed, and the Fort Wayne much less. The two leases should be considered together with regard to their effect on the prosperity of the Pennsylvania Railroad Company. Having them both, it is for its interest to turn the traffic by that route by which the least expense will be incurred. Actually, we believe that hardly any shipments between Chicago and Pittsburgh are made *by the Pennsylvania* Railroad. The through traffic that enters and leaves Chicago by the Columbus road nearly all passes by way of the Atlantic & Great Western and Erie roads, and not by the Pennsylvania.

THE SOUTHWESTERN RAILWAY ASSOCIATION.

The Southwestern Railway Association has been dissolved, just about as it was a year ago, and, we should say, with just about as good a prospect of being reorganized, though very likely after a longer interval. It was first organized in September, 1876, for the purpose of regulating the rates and competition for the traffic of what are called "Missouri River points," namely, Kansas City, Leavenworth, Atchison and St. Joseph, which to Chicago are southwestern points, but to St. Louis are western or northwestern. The traffic is a considerable one, and grows rapidly, but there were three lines to Chicago and two to St. Louis competing for it—more lines than compete for the traffic from New York to the West. One great difficulty was to settle upon and maintain the difference between Chicago rates and St. Louis rates, both these places competing strongly for the business of Kansas, which is chiefly that of the "Missouri River points," though two of the four are in Missouri. The arrangements of the Association have been varied somewhat from time to time, and for the first year and a half were often unavailing to prevent railroad wars; but there seems always to have been some advantage reaped by it, and for the last year it has been rather unusually successful. It was dissolved on March 15, a year ago, at the instance of the St. Louis roads, which did not make any demand for any change in the terms, however. On the 6th of May it was reorganized, the St. Louis roads being allotted 45 per cent. and the Chicago roads 45 per cent. of the business, the other 10 per cent. going by the Hannibal & St. Joseph to the Wabash. Roads receiving more than their proportion did not transfer freight, but transferred their receipts for the excess carried, after deducting an allowance of 40 per cent. for the expense of carrying it—made purposely an insufficient allowance, that there might be no inducement to work for more than the allotted share of the traffic. This arrangement seemed to work very well. There have been difficulties during the year, but the money payments are said to have been made with gratifying regularity and promptness, and the parties to the arrangement seemed generally to be satisfied with it. Not long ago it was extended to cover lumber shipments to Missouri River points—probably more than one-half of the freight in that direction, which had not been pooled at first, and which was consequently carried at extremely low rates.

The rock on which the Association now splits is one which it is extremely difficult to avoid, namely, the appearance of a new competitor on the scene. The Chicago & Alton Railroad has heretofore had no road of its own into Kansas City. Its connection was made through 162 miles of one of the St. Louis roads—the St. Louis, Kansas City & Northern, which thus, for this distance, got a share of the Chicago traffic, as well as its half (or other proportion) of the St. Louis traffic. As is known, the Chicago & Alton, within the past year, has constructed a line of its own into Kansas City, to which, of course, it transfers its share of the traffic. This could not be objected to, of course, but with its new line the Chicago & Alton has a line between Kansas City and St. Louis, as well as one between Kansas City and Chicago, and on this account it not only transfers its Chicago traffic to its new line, but it demands a share of the St. Louis traffic as well. It is a somewhat circuitous route, it is true, crossing the Mississippi twice; but after all it is only 322 miles long, against 277 by the St. Louis, Kansas City & Northern, and 282 by the Missouri Pacific—that is, the Chicago & Alton is about 15 per cent. longer than the other two lines. It is made more disadvantageous to it (though not to the public using the road), by the fact that it must use the St. Louis bridge and pay the heavy tolls on that for traffic consigned to the city of St. Louis; but on the other hand it avoids the expense of this bridge for traffic to East St. Louis, where there are elevators and the chief stock-yards of St. Louis, and where, probably, most shippers would prefer to have their shipments of flour and grain delivered.

What share of the St. Louis traffic was demanded by the Chicago & Alton we do not know. There is a report that it asked for one-third, and that the other two St. Louis roads refused to give it any. Evidently it can get some share of the traffic. How much effect the 15 per cent. of additional length will have, it is not easy to say; but usually it does not have a great deal on freight traffic. The longest freight line route from New York to Chicago is just about 15 per cent. longer than the shortest, and it gets a pretty large proportion of the traffic, and would doubtless get a much larger one were not two of the three companies whose roads compose it interested in sending traffic by other routes also. The cost of conducting the traffic by the longer route and the probability of getting a large share of it are two entirely separate questions; it might easily happen that the costliest route would be the favorite one.

In any case of this kind, where a new competitor appears, it is quite impossible to tell what share it can secure without trying. The trying is likely to be so costly a process that the parties concerned may well attempt to agree upon some division, without proceeding to the extremity of a contest for traffic; but then the division would be, to a great extent, the result of

a guess, having no basis of experience to rest upon. That is apparently what the roads to Missouri River points have determined upon. Unfortunately, the contest cannot be confined to St. Louis traffic. When St. Louis rates are reduced Chicago rates must be, or Chicago and Chicago roads will lose the business. Rates have been reduced more than one-half, we understand, and Kansas farmers are having a glorious opportunity to send out their grain and bring in their lumber at less than the cost of hauling.

It is noticeable that it was taken for granted that the competitive contest could not be made with regular and maintained rates. The very first step was a reduction. It might be thought that the three roads to St. Louis could exert themselves to get the largest possible share of the business for each, while maintaining rates, with no more than the usual "cuts" made where there are no pools. But where there is a new road in the market, it can get no traffic without getting it away from some one, and to do that it is usually necessary to offer some inducement. Once introduced, this is less necessary, and a tolerable maintenance of rates may exist together with great activity in soliciting traffic, though it never continues permanently. But the new road usually introduces itself by cutting rates, and cannot do so otherwise, unless it possesses decided advantages over the older routes.

In this case the contest is wholly over a point which affects the lines to St. Louis only. The Chicago roads, aside from the Chicago & Alton itself, are entirely unconcerned as to the issue. They fight because they must, not to gain anything. But they have to fight, nevertheless, and to do so to the best advantage they have united as they did a year ago, agreeing to divide the Chicago business on the old terms, and to take common action in meeting the rates of the St. Louis roads, or cutting under them, as may be thought expedient. It is not probable, however, that they will take any part in the settlement of the division of the St. Louis business, should that ever come to a settlement, which we deem probable, though a long time may elapse first. That is a question for the St. Louis roads alone, one of which the Chicago & Alton now claims to be.

The Chicago routes are in much the best condition to endure a prolonged contest of this kind. They have light fixed charges, while the two old St. Louis roads have heavy ones. Moreover, none of them depends to so great an extent on the traffic over which the contest is held. These places cannot be said to be the main western termini of any of the Chicago roads, though their traffic is certainly important to them, and the loss of the profit on it will be felt very sensibly in their treasuries.

The greatest injury by the change, whatever may be the result of this contest, will fall upon the St. Louis, Kansas City & Northern road. In any event it will lose the haul of 162 miles on the Chicago & Alton's Chicago traffic. Then whatever St. Louis traffic the latter road may get must be taken from the St. Louis, Kansas City & Northern and the Missouri Pacific.

Probably the worst effect of the contest is the impression it makes on the public mind. Kansas is an immense distance from the chief markets for its products. Very low rates indeed on some of its coarse products sometimes absorb nearly their whole value by the time they reach the consumer. To no one, scarcely, on the face of the globe, are transportation rates so important as to the Kansas farmer. Now, when for a considerable period the railroads carry his grain from Kansas City to St. Louis for 5 cents per 100 lbs., and to Chicago for 10 cents, it is next to impossible to convince him that the 15 and 20 cents that are usually charged (though these are lower than in almost any other country in the world) are not extortionate and oppressive rates. This is a real danger; for these men act upon their conviction, and are liable at the first opportunity to embody it in legislation. Railroad wars, as we have said before, are the seed of Granger laws, and it does not look well for the Chicago and St. Louis railroads to be sowing so large a crop of these noxious weeds.

The Master Car-Builders' Convention.

We have been requested to call attention to an error in the printed report of the last convention of the Master Car-Builders' Association. On the last page of the outside cover it is announced that the next annual meeting will be held in Chicago on the *first* Tuesday in June. This should be the *second* Tuesday, which will be June 10. The convention will be held on the latter date.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Philadelphia & Reading.—This company has completed a branch from Harrisburg, Pa., to Baldwin, 2¼ miles.

Utah & Pleasant Valley.—Track laid to a point 21 miles southeast of Springville, Utah, being an extension of 7 miles. It is of 3-ft. gauge.

This is a total of 9¼ miles of new railroad, making 326 miles reported thus far this year, against 258 miles for the same period in 1878, and 232 miles in 1877.

THE TRUNK LINE PRESIDENTS' MEETING, held at the Windsor Hotel last week, took exceedingly important action, as will be noted in our report, concerning which it may perhaps be said that it ought to have been taken last September if it had been intended to carry out the recommendations of the Saratoga conference. A year ago the winter business was spoiled, and last fall the companies felt that something should be done to prevent a repetition of the experience. But instead of doing something they contented themselves with saying that something should be done. They made a plan, but provided no means for executing it, and preserved and kept at work the machinery for preventing its working. Now that the winter traffic is over, which might have been fairly profitable as it was unequaled in bulk, the managers seem to be taking the steps necessary for carrying out the scheme they devised last fall. The gist of it is, one body (the Joint Executive Committee), representing all the companies interested, to make rates and divisions, and another body (the Board of Arbitration) to settle all disputes. Of course the action of the trunk lines does not bind all the companies interested in the through traffic, but it does most of them, and gives a tremendous impulse to the plan, the more so as the Western roads themselves were foremost (and virtually unanimous, we believe, in proposing it last winter). And if in one sense the action began six months too late, in another it is just in time. No great amount of money can be made out of east-bound through freight in the summer, it is true, but there will be business after summer, and provision for it needs to be begun now. Experience has shown that such arrangements are not the affair of a day or a week or a month. To get them into working order requires time, and if we wait until navigation closes before trying to do anything, another winter's business will be spoiled. Moreover, if not a great deal can be made out of the spring and summer business, a great deal can be lost by it, as experience has shown. The satisfaction is not as positive when a loss of a hundred thousand is avoided as when a gain of an equal amount is made, it is true; but the result is quite as advantageous, and to some of our roads with heavy fixed charges may be more so—as much more so as a loss of a dividend is less to be feared than bankruptcy.

YARD AND TRAIN-MEN will do well to consider and reply to the circular of the committee of the Master Car-Builders' Association which we publish on another page. This circular, it will be seen, is a general invitation to all yard and train-men to communicate with that committee. Train-men, no doubt, have opportunities of seeing and knowing the evils which exist and which make their occupation so fearfully dangerous. If each one of them would take a sheet of paper and write out what he has learned by experience in the chief causes of accidents and danger, and forward it to the committee, he would be doing a real service to all who are exposed to the risks of their calling.

One of the difficulties which the committee will encounter, however, grows out of the fact that the patentees of various inventions have been extremely industrious in going about and inducing yard and train-men to write letters to the committee, recommending their inventions as a sovereign cure for all the ills that are complained of. They are using every exertion to lead the committee to report favorably on their devices. Such a report would undoubtedly cast suspicion on the work of the committee, who, in order to accomplish the purpose which was contemplated when they were appointed, need not do more than point out general conditions which must be fulfilled in order to secure safety.

Contributions.

The Springfield Engine.

TO THE EDITOR OF THE RAILROAD GAZETTE:

"Springfield's" last letters do not give any more information or data to support his claims as to the superiority of the "Eddy" over the ordinary locomotive than did his first. His exceptions to my preference for solid frames are answered by his claim that boilers should have as few pieces as possible, and the ease with which the frames now used as a standard by almost all American builders can be taken off and repaired, when necessary, proves that it is not necessary to multiply pieces in order to make frames accessible for repairs.

As "Springfield" has not given any proof of the "Eddy's" economy in the use of fuel over other engines, it is not necessary to say anything on that point, further than to call attention to the fact that "Springfield" frankly admits that he has no means of knowing the amount of water evaporated per pound of coal, or the amount of energy, in foot-pounds, exerted per pound of coal, in a "trial most carefully conducted." These data were, of course, taken, if the trial was "most carefully conducted," and it is to be presumed "Springfield" would be allowed to copy them, on applying to those making the experiment. Whether an engine is an economically working one or not is not shown by the miles run to a ton of coal, but by the work done; and this should be computed on a tonnage-mileage basis, as it is obviously unfair to work a small engine against a very large one, keeping the record of fuel burned per mile run as a basis of comparison; and again, before a comparison between different engines on different railroads or even different divisions of the same road is made, the co-efficient of resistance per ton for each division should be ascertained by carefully-conducted dynamometer tests.

Carefully-conducted trials of the merits of different classes of engines by an entirely disinterested committee, as you have suggested, would not only be interesting, but of great value. The engines used in making these tests should be new, so that there would be no advantages in the steaming qualities of the different boilers, excepting such as are due to their plan of construction, etc. They should also be run over the same grades, use the same kind of fuel, and, as nearly as possible, draw trains composed of the same class of cars.

All of this controversy in regard to the different engines has grown out of the fact that "Springfield" has made great claims for the superiority of the "Eddy" engine over al other kinds; claiming greater economy in repairs, greater economy in fuel, and greater amount of work performed, and, as yet, he has proved nothing. The economy in fuel was claimed to be obtained by using short and broad fire-boxes, perforated dry-pipes, and small ports to cylinders; but later he says that it was due almost entirely to "small ports." If this is the case, economy can be obtained by the use of small ports in any engine; so the other peculiarities of the "Eddy" go for nothing. No one claims that the addition of driving-wheels to an engine will increase her economy in fuel or her power; but when the power wanted is greater than the tractive force to be obtained by two pairs of driving-wheels, with weight which will not be destructive to the track, more driving-wheels must be used. "Springfield" claims that 18,000 lbs. tractive force is obtained by the "Eddy" with 52,000 lbs. on the driving-wheels, and expects to obtain 21,000 lbs. with the same weight—a co-efficient of traction equal to 40 per cent., which is contrary to all experience in Europe or America. In Europe the reliable factor is about 18 per cent., while the best results recorded in America are from 25 to 30 per cent., and the reliable co-efficient is 22 per cent. on a dry rail without sand. If the "Springfield" engine shows more than that, there must be greater weight on the driving-wheels than stated, and in this connection I would call attention to an extract from the Springfield *Republican*, published on page 163 of your issue of the 21st ult., which (although not proof) goes to show that the "monster freight engines," with the 13,000 lbs. on each wheel, are not considered as being perfect, even at home, and that complaints were being made in the direction pointed to in my first letter.

A cylinder 18¾ × 28 in. is no doubt capable of exerting 21,000 lbs. for traction, if the "Springfield" engine has boiler enough to furnish steam to run it to its fullest capacity, which is to be doubted. But it ought to furnish steam to cut off at one-fourth of the stroke and to run at a speed of 15 miles per hour. This cylinder, cutting off at that point and using steam at 120 lbs., ought to exert a tractive force of about 11,000 lbs., which is all that can be expected from an engine with 52,000 lbs. for adhesion, without using sand.

The large cylinder of the "Eddy" engine is undoubtedly an advantage, and the economy of using steam at a very short cut-off is not disputed, and in that respect no one will doubt that the engine in question is of the best, but the other peculiarities will have to be proven to be of value before being finally adopted as a standard.

But this controversy has probably become wearisome to your readers, and possibly your subscription lists lessened thereby, so it had better be stopped. "W."

April 11, 1879.

Curve Resistance.

WHEELER, Ala., April 8, 1879.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The discussions you have published, and the reference you have at various times made to the paper on "Resistance of Railroad Curves," presented to the American Society of Civil Engineers last April, has promoted the object the writer had in view in its preparation, viz., to direct attention to the subject and secure its more careful examination and discussion. Engineers have reason to thank Mr. Chanute for the very valuable summary of the existing experimental data and results presented in his discussion of the paper.

Referring to the discussion by Mr. Emery, printed in your paper of April 5, and to which Mr. Wellington approvingly refers in a communication in the same paper, I must beg leave to differ from the ideas advanced by him (Mr. Emery), and, with your permission, will state my reasons therefor.

I presume Mr. Emery discussed the paper *extempore*, directly after its reading, and before he had time to give either the paper or the subject a careful and deliberate examination, and it would not be surprising if he fell into errors in a matter of no little complexity.

1st. I cannot see "that it is erroneous to consider the longitudinal and transverse slipping separately." I think the method pursued in the paper is correct, and leads to greater simplicity of analysis. The formula given for flange resistence embraces, it seems to me, every element of resistance caused by the pressure of the flange against the rail, and the consequent dragging of the tread of the wheel across the top of the rail, as pointed out. The slipping of the wheel longitudinally is an independent source of resistance which would exist if the wheels had no flanges, but were guided along the curve by some other means. It would be quite possible to embrace both kinds of resistance under one formula, as Mr. Emery suggests; but no advantage would be gained. I have not taken the time to investigate fully Mr. Emery's diagram (fig. 1), but I am of the opinion that computations made in accordance with it would not differ materially in result from that obtained by taking the sum of the two formulæ given in the paper, to cover the same ground.

2d. Mr. Emery's point in reference to the force required to turn the car-body through the angle from one tangent to the other, appears, at first sight, well taken; but a little consideration will show that it is unworthy of notice. If we suppose the car-body resting at its centre of gravity on a point upon which it turns without friction, and neglect the resistance of the atmosphere, any force, however small, applied to either end, perpendicular to its axis, and in the plane of the horizon, will cause it to move, and if the force is then removed, the car will continue to revolve until opposed by a force equal in amount to the one that put it in motion. In actual practice, however, it would be necessary to overcome the friction of the support on which the body turns, and the resistance of the atmosphere. In the case of a car, with two bogie trucks, entering a curve, the leading truck would be revolved on the support through an angle equal to 90°—the acute angle between the radius to the curve and the chord passing through the two supports of the car, and the rear truck would be revolved an equal amount in the opposite direction; but as soon as the car was fully upon the curve there would be no more motion, and, consequently, no more friction on the supports so long as the curve remained of constant radius, and, except for the very small resistance of the air, the car-body would continue to revolve without the consumption of force, until stopped by an equal opposite force, when the car should leave the curve; and, so far as track resistence is concerned, the one would counterbalance the other. There only remains the slight resistance offered by the air, which, as I said before, is not worthy of notice.

3d. I feel sure that had Mr. Emery taken a moment's thought he would not have disagreed with me as to the fact of loss of tractive power at each angle of the funicular polygon of the train. It is because the line of tractive power is *not* like a rope passing around a pully that loss of power occurs. If this point is not clear to any reader, let him refer to Coxe's Weisbach, vol. 1, § 152, page 288, where the principle is fully demonstrated.

S. WHINERY.

Rule for Location of Frogs in Crossings.

TO THE EDITOR OF THE RAILROAD GAZETTE:

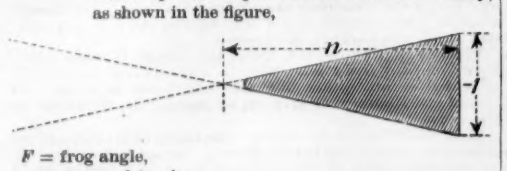
The rule for locating the points of frogs in through cross ings between straight and parallel tracks, criticised by Mr. Bell in your last issue, is one used by many engineers in making hasty mental calculations when the distance of one frog in advance of the other is to be determined approximately; but I was not aware that it was given in any work as mathematically exact. He is correct in saying that the result obtained is too great and produces a "tightness" of gauge in the crossing—between the frogs—which should not exist.

In order to set the frogs accurately, it is necessary to make use of the *theoretical* or *mathematical* point of frog, which can be readily determined by stretching strings along the gauge lines of the frog and making the point where they intersect each other.

The distance from the point of one frog to the point of the other, measured in direction of parallel tracks, may be determined as follows:

Let x = this distance,

n = frog number, or the length of tongue from theoretical point to a point where the width = unity, as shown in the figure,



F = frog angle,

g = gauge of track,

δ = *space* or distance between gauge lines.

Then we have

$$\delta = 4 \tan. F + \frac{g}{\cos. F} \quad \ldots\ldots (a)$$

$$\text{but } \tan. F = \frac{4n}{4n^2 - 1} \text{ and } \cos. F = \frac{4n^2 - 1}{4n^2 + 1},$$

which substituted in (a) gives, by reduction,

$$4 = n(\delta - g) - \left(\frac{d + g}{4n}\right) \quad \ldots\ldots (b)$$

That is, the distance between points of frogs, measured in direction of parallel tracks, is equal to the difference between the *space* and gauge multiplied by the frog number—diminished by the sum of space and gauge divided by four times the frog number.

In the example given, in which $g = 6$ feet, $\delta = 8$ feet and $n = 9$, we would have by this rule:

$$4 = 9(8 - 6) - \left(\frac{8 + 6}{4 \times 9}\right) = 17.61 \text{ feet, instead of 18 feet.}$$

In the second example, $g = 6$ ft., $\delta = 8$ ft. and $n = 5$,

$$4 = 5(8 - 6) - \left(\frac{8 + 6}{4 \times 5}\right) = 9.3 \text{ feet, instead of 10 feet.}$$

TYRONE, Pa., March 22, 1879. J. R.

The Cross-Over Frog Rule.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I was pleased to find in last week's *Gazette* Mr. French's graceful acknowledgment of the erroneousness of his cross-over rule.

If he had stated, in connection with the rule, that it was only "intended as an approximation," I would not have criticised it. But as he wrote that "the proof of the rule' was "obvious," I inferred that it was advanced as being theoretically correct.

If Mr. French will trouble himself to peruse my criticism, he will observe that I do not question the practicability of his rule, but confine myself to pointing out the error of its theory.

In connection with the rule (Roadmaster's Assistant, page 172), he states that "In the above rule it is assumed that the track between the points of the two frogs is straight." My criticism was that "when the frogs are placed in a cross-over track in accordance with the directions of the rule," *i. e.*, if the points of the frogs are placed a certain distance apart, as determined by the rule, and the track between the frogs is made straight, as it is assumed to be, then "the cross-over track will be tight gauge." As a matter of course, after the frogs have been placed in position, a practical trackman will bring the rails opposite the frogs to gauge, and thus make the track passable for trains. But, as Mr. French very aptly expresses it, "the discrepancy" will then "occur in the line with the frog." That is, the track between the points of the frogs will not be straight. Or, in other words, the requirements of the rule will not have been carried out, which is the point that I wished to make.

Mr. French is entirely correct in his inference that I have not used the rule. I noted its erroneous character on comparing it with some calculations which I had made for my own use in putting in cross-over tracks. I will present my rule for criticism in the course of a week or two.

I do not find in my language anything which is calculated to convey the impression that I object to the use of the general term "point of frog." On the contrary, I not only consider it a proper term, but I fully agree with Mr. French that the *theoretical* "point is the only part of a frog the position of which is definite, and all measurements pertaining to a frog should be referred, directly or indirectly, to that point." Mr. French omits the word *theoretical*, but, of course, he means the theoretical point, as the actual point has no definite position until it is located by fixing its width.

What I objected to was the use of the *undefined* term "point of frog," which would, unquestionably, be construed by trackmen as meaning the actual blunt point (located several inches from the theoretical point), while the rule obviously refers to the theoretical point. I had not the slightest intention of suggesting that Mr. French should undertake the hopeless task of defining a mathemetical point for the information of trackmen, so that they might use his rule understandingly. On the contrary, I consider that the rule should be made to suit the kind of frog points with which trackmen are familiar.

Mr. French's solution of the problem, although somewhat labored, is correct for the distance between the *theoretical* points of the frogs.

R. BELL.

ELMIRA, April 14.

Friction and Velocity.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the *Gazette* for April 4 appears a communication from Mr. William Loughridge in which he says: "I unhesitatingly give it as my opinion that Mr. Westinghouse and Captain Galton are entirely mistaken when they assert that friction varies with different velocities as set forth in your editorial. Upon this opinion I am willing to be adjudged competent or incompetent either to write a reliable paragraph for a newspaper or to construct a practical air-brake."

As a student who has become much interested in the study of "friction and the laws governing it," I—and I have no doubt others—would much like to know what "experiments" Mr. Loughridge has made to verify the "laws of friction" as laid down by M. Morin and accepted by Professor Bartlett, of West Point, and others?

Opinions can hardly have weight against the proof offered by Mr. Westinghouse and Captain Galton, Professor R. H. Thurston, of the Stevens Institute of Technology, Messrs. Higginson and Webber, of the Chicago, Burlington & Quincy Railroad, and others, to the effect that the "generally accepted laws of friction," if not absolutely incorrect, must at least be accepted with some modifications.

The most recent experiments have been made, on improved testing apparatus, in the light of modern science, by men like Professor Thurston, who do not usually publish their *conclusions* until they have something substantial on which to base them; nor do they found their opinions of "the laws of friction" on their ability to write "a newspaper paragraph or to construct a practical air-brake."

Does Mr. Loughridge intend to say that because "the laws of friction," as laid down by Morin, have been "generally accepted," without question, until the present time, as correct, they must necessarily be true, merely because they are old?

Is there any one department of science to-day which has not been more or less affected by recent developments and discoveries?

Are we to decline to accept the proofs offered by Mr. Westinghouse and Mr. Loughridge himself, that a train can be stopped by continuous brakes, in what a few years ago would have seemed an incredibly short distance, merely because it does not agree with old ideas and what people then believed to be true, with their limited knowledge?

Would any one, twenty years ago, have believed him if Mr. Loughridge had published in his advertisement *then* instead of now, the following: "The best stop yet accomplished in the world with air brakes was made with this practical invention (the Loughridge air brake) on the Baltimore & Ohio Railroad. The train weighed 250 tons and consisted of ten cars; speed, $46\frac{6}{10}$ miles per hour; time in stopping, 16 seconds; distance run, $587\frac{8}{12}$ feet?"

Would not that statement then have seemed as absurd to the practical men of that day as the idea now presented to Mr. Loughridge that the old laws of friction may be either partly or wholly wrong, as indicated by Mr. Westinghouse and others?

Is Mr. Loughridge correct in, and on what does he base his assertion that these "old laws" are "the general belief of the master mechanics of the world?"

If that is so, why does the Master Mechanics' Association spend so much of its time in discussing the subject of "friction and lubrication" if the old laws are implicitly accepted and believed?

Do not they often find a wide difference between theory and practice?

Enough has certainly been published to indicate clearly that many of our thinking men of to-day do not accept the laws of Morin as infallible, and that they are striving to collect reliable data of what is being done.

It seems to me reputations would suffer less by a thorough and frank interchange of opinions based on facts accomplished, than by an attempt on the part of some "to bolster up old theories," or on the part of others "to formulate new laws."

Would it not be better for the older members of the engineering profession to tabulate and publish the results of their experiments and experience, in order that the old laws, if true, may be strengthened, or, if untrue, that they may be replaced by others which at least may have the confidence and indorsement of the "best minds" of to-day?

Certainly Mr. Loughridge himself could offer from his varied experience something more substantial than mere opinions based on the confidence he may have in one or two men.

It is to be hoped that this subject will be thoroughly ventilated, and that those who believe in Morin will offer convincing proofs in refutation of the proofs submitted by the gentlemen quoted as differing from Morin, in justification of the position taken by them.

EBEN F. WELLS.

April 10, 1879.

Trunk-Line Presidents' Meeting.

There was a meeting of the presidents of the trunk lines, or their representatives, at the Windsor Hotel, New York, on Wednesday and Thursday of last week (April 9 and 10), to consider the division of east-bound traffic at Baltimore, Philadelphia and Boston, concerning which there had been a meeting in Philadelphia, March 5, and to transact some other business, part of which came down from the Chicago meeting last December.

From the New York Central were present W. K. Vanderbilt, Second Vice-President, and J. H. Rutter, Traffic Manager; from the Erie, H. J. Jewett, President, and G. R. Blanchard, Assistant to the President; from the Pennsylvania, Geo. B. Roberts, First Vice-President; A. J. Cassatt, Third Vice-President, and J. L. Gossler, Assistant General Freight Agent; from the Baltimore & Ohio, J. W. Garrett, President; M. H. Smith, General Freight Agent, and A. Anderson, President's Assistant.

A report from Commissioner Fink concerning the distribution of west-bound freight from Baltimore, Philadelphia and Boston was received and discussed. Some companies having urged their claims to a larger proportion than was proposed in this report, the subject was recommitted to Mr. Fink for further consideration and report, as the agreement of the trunk lines prescribes.

A report was received from the Executive Committee upon certain resolutions offered by President Garrett, Dec. 5, in which the committee says:

"In accordance with said resolution (passed in New York, March 1), all the members of the Trunk-Line Executive Committee and Commissioner Fink met in the Continental Hotel, Philadelphia, on Wednesday, March 5, 1879, and after a full discussion, are of the opinion that the differences which have heretofore existed between the trunk lines themselves, between the trunk lines and their various connections, and between independent western companies, irrespective of the trunk lines, upon the various important questions presented by President Garrett's resolutions, continue to prevent their adjustment at this time by the means now organized, and especially so in the absence of any final authority of appeal and arbitration."

The committee unanimously recommended the organization of the Joint Executive Committee and the twenty rules for their government which were proposed at the Chicago meeting, Dec. 18 and 19. That each trunk-line president name a member for that committee to act for all the roads that the trunk line controls as well as for the trunk line itself, and authorize him to act for such other Western roads as may appoint him to represent them; that all Western companies be solicited to place representatives upon this Joint Executive Committee; that such committee, when all the members have been named, shall alone have power to make, change and enforce all through passenger and freight rates and rules in both directions, from, to or beyond their respective termini and common points upon all competitive traffic common to any two or more trunk lines, and prescribe such rules and exercise such power over all officers, soliciting and contracting agents as may be necessary for the maintenance and enforcement of agreed rates, classifications, rules and penalties. The committee recommended that if any connecting line fails to delegate authority to or appoint a member of the Joint Committee, the presidents authorize the Trunk-Line Executive Committee, in connection with the Joint Committee, to take such action as they may think proper toward such companies. The principle of pools is affirmed, for freight and passenger traffic in both directions. The committee further urge "as an essential to any permanently successful results, the distinct adoption of the principle of arbitration;" and, in order to carry it into effect, they recommend the appointment of a permanent board of arbitration, to be named by the Joint Executive Committee, to which any differences arising in this Joint Committee, whether in the formation of pools or the maintenance of rates, and whose decision shall be final and binding upon all parties until changed by unanimous agreement of the Joint Executive Committee or the board of arbitration itself. The committee reported that they believe, as the result of years of trial of all other methods, that nothing less than the adoption and enforcement of the foregoing will accomplish the desired end.

The members of the Trunk-Line Executive Committee who signed this report were J. H. Rutter, G. R. Blanchard, A. J. Cassatt, and M. H. Smith (signing for John King, Jr.).

This report was adopted by the trunk-line presidents, and the rules proposed at Chicago for the government of the Joint Executive Committee, with a few additions relating

to the proposed board of arbitration, were adopted, as follows:

RULES FOR THE GOVERNMENT OF THE JOINT EXECUTIVE COMMITTEE.

First—That the committee be known as the Joint Executive Committee.

Second—It has been organized by the election of Albert Fink as permanent Chairman, and N. Guilford as permanent Secretary.

Third—The general office of the committee shall be located at New York, and the Chairman and Secretary be authorized to incur such expense as is necessary to fulfill its purpose.

Fourth—It shall take cognizance of all through competitive freight and passenger traffic in both directions.

Fifth—Its object shall be the maintenance of agreed rates, and the abatement of expense on all such traffic by all initial and connecting lines.

Sixth—It shall convene at the call of the Chairman or any three (3) of its members, on a notice of forty-eight hours, when necessary; otherwise, such additional time shall be given as may be practicable.

Seventh—The point of meeting shall always be in New York, when no other point is specified in the call.

Eighth—The object or objects of every special meeting shall be stated in each and every call therefor.

Ninth—Regular meetings shall be held in New York the third Tuesday of each month, unless the Chairman advises the members in the prior week that no business will be ready for presentation thereat.

Tenth—The committee, or a majority of the committee, or their representatives, shall constitute a quorum for the transaction of business.

Eleventh—If at any time two-thirds of the members of the committee, or their alternates or representatives authorized to act, are present, the Chairman shall act and vote for the members absent or those present who are not authorized to act.

Twelfth—In case any question brought before this committee fails to receive its unanimous action, such question shall be referred to the Chairman, who shall decide the case upon its merits, and whose decision shall have the same force and effect as the unanimous vote of the committee.

Thirteenth—Any two or more of the members of the committee, or their alternates or representatives, may meet and act with the Chairman upon questions local to them.

Fourteenth—All negotiations between the committee and companies not represented by it shall be carried on solely through the Chairman.

Fifteenth—All companies are to make all complaints as to direct or indirect violations or evasions of rates promptly, by wire and mail, to the Chairman of the Committee, accompanied in all cases with as much proof as may be obtainable.

Sixteenth—All companies, parties thereto, agree not to take any steps to meet alleged abatements or evasions of rates by other lines until the committee has acted thereon and announced its conclusions.

Seventeenth—The committee is authorized and empowered to specify and enforce against all companies such rules and regulations for its purpose as it may from time to time adopt, and the committee or the Chairman acting therefor may call for all persons and papers it may desire.

Eighteenth—The Western members of the Joint Committee shall represent and act for all Western companies which the Western Executive Committee has heretofore represented or acted for.

Nineteenth—The Chairman of the Joint Committee shall ascertain promptly, and report as early as practicable, what other companies, Eastern and Western, do or do not agree to be bound by its proceedings; and what member, alternate and representative upon the Joint Committee shall represent their several interests.

Twentieth—In the event of any company withdrawing its member upon the committee, or the authority it has given any other member, alternate or representative to act therefor, it shall give not less than thirty days' notice to the Chairman; but this agreement shall nevertheless continue in force among the remaining parties hereto.

Twenty-first—The principle of pools, in both directions, is affirmed upon all through freight and passenger traffic common to any two or more of the trunk lines, and their representatives on the Joint Executive Committee are directed to call the full Joint Executive Committee together at an early date, to perfect such pools and adopt such rules and regulations for the maintenance of rates, and their enforcement, as the said Joint Executive Committee may deem just.

Twenty-second—In view of the differences then likely to arise in said Joint Executive Committee, as an essential to permanently successful results, the distinct adoption of the principle of arbitration is also affirmed, and in order to carry it into effect, a permanent Board of Arbitration shall be appointed by the said called meeting of the Joint Executive Committee.

Twenty-third—Any differences, of whatever nature, arising in said Joint Executive Committee, in the formation of such pools, or in any matter, act or thing relating thereto, or to the maintenance of rates in the absence of pools, upon which the Joint Executive Committee is not unanimous, shall be promptly referred to the said Board of Arbitration; and the decision of said Board of Arbitration, or that of a majority of its members, shall be final and binding upon all parties, until changed by unanimous agreement of the Joint Executive Committee, or by the said Board of Arbitration.

Trunk Line Orders as to Rates.

The following is a copy of instructions issued to all line managers and agents of trunk lines:

DEAR SIR: You are hereby directed to maintain strictly, and to see that all the agents of your line do strictly maintain hereafter, commencing with April 9, 1879, the established tariff rates, or such rates as are properly authorized from time to time by the joint action of the trunk lines on all west-bound competitive freight from Boston and New England competing points, from New York, Philadelphia and Baltimore to Toronto, Buffalo, Suspension Bridge, Black Rock, Salamanca, Erie, Dunkirk, Pittsburgh, Wheeling, Bellaire and Parkersburg, and all points beyond.

The following named officers are the *only* parties authorized by this company to furnish you with the tariff rates, and whose instructions regarding rates you will strictly carry out, viz.:

From *Boston and New England competitive points:*
For New York Central—H. J. Hayden and C. L. Hartwell.
" New York, Lake Erie & Western—A. A. Gaddis.
" Pennsylvania—J. L. Gossler.
" Baltimore & Ohio—M. H. Smith.
" Central Vermont and Grand Trunk—Lansing Millis.

From *New York:*
For New York Central—R. L. Crawford.
" New York, Lake Erie & Western—A. H. Ward.
" Pennsylvania—J. L. Gossler.
" Baltimore & Ohio—M. H. Smith.

From *Philadelphia:*
For New York Central—J. Lowrie Bell and Ellis Clark.
" New York, Lake Erie & Western—T. J. Klase.
For Pennsylvania—S. B. Kingston.
" Baltimore & Ohio—J. S. Wilson.

From *Baltimore:*
For New York Central—A. W. Nutt.
" Pennsylvania—A. W. Nutt.
" Baltimore & Ohio—M. H. Smith.

You are not permitted, nor will you permit the agents of your line to become a party to any transaction directly or indirectly, or to be instrumental in any way, openly or secretly, in securing to any shipper reduced rates of transportation below the regular tariff rates, either on account of the line, or on account of the individual railroad companies forming the line, or on account of any of their connecting roads, either by change in the classification, or incorrect weights, or by giving passes, or purchasing tickets, or in any other way in which preference may be given to one shipper over another, it being the intent and purpose of this order to secure to all shippers between the same places the same rates of transportation for like service performed by all competing roads.

You are further requested to report to this office any transaction that becomes known to you, made or entered into, by the agent of your or any other line, or by any officers or agents of any company in the line, or of a connecting or competing road, which is made in violation of this order, and which has for its purpose or may have the effect to defeat the object of it.

The same instructions as the above have been issued to all general managers and agents of transportation lines from the places above named, and have been made known to the managers of all the roads in the lines and their connecting roads.

You are requested to give notice, and see that notice is given, to all shippers who may heretofore have had reduced rates over your line by your authority, or by the authority of any of your agents, that hereafter full tariff rates will be charged.

You will be held responsible for carrying out these instructions, and you will discharge any agent of the line who violates the same.

Please acknowledge the receipt of this order.

Accompanying the above instructions the following circular has been issued by the Trunk Line Executive Committee:

Office of the Trunk Line Committee,
NEW YORK, April 5, 1879.

DEAR SIR: Inclosed please find copy of an order issued to the managers and agents of all fast freight and dispatch lines working over our roads which we propose to enforce in accordance with the authority given to us by the fast freight and dispatch line contracts, and by repeated action of conventions of the officers of our Western connecting roads, by which west-bound rates are solely under the control of our roads.

You are therefore notified that from April 9, 1879, we decline to recognize any reduction in the established tariff rates, and decline directly or indirectly to pay part of such reductions, or share in the same in any way either now or at any future time.

We also earnestly request you to withdraw any authority that you may have given to agents of your road or connecting roads, or to agents of fast freight lines, to make special rates, and that you issue to all such agents the same order as has been issued by the trunk lines.

If the compliance with this request should in any way work injustice to the interest of your company, you will please communicate this fact, with your views as to the proper remedy, to the Commissioner, who is authorized jointly by the trunk lines to carry out any agreement that you have made or may make with any of your competing lines in regard to the division of traffic.

In case no division has yet been made, the Commissioner will furnish you all necessary information regarding the distribution of traffic, and will assist you in making an equitable division, securing a fair share of the business, at the established tariff rates, to your company.

There can be no doubt that a compliance with the above request will be in the interest of all the connecting railroads as well as the trunk lines, and will remove an evil of which the public has heretofore justly complained, but which it is impossible to remedy except by the coöperation of all competing railroad companies.

In view of the often repeated requests of the Western roads to secure the assistance of the trunk lines in maintaining the established tariff rates, it is hoped that we will have your cheerful coöperation.

Please acknowledge receipt of this communication to the Trunk Line Commissioner at New York, and state whether you will take the action above suggested, and whether we may rely upon your coöperation in our efforts to maintain the established tariffs.

J. H. RUTTER,
for New York Central & Hudson River R. R.
G. R. BLANCHARD,
for New York, Lake Erie & Western R. R.
A. J. CASSATT,
for Pennsylvania R. R.
JOHN KING, Jr.,
for Baltimore & Ohio R. R.

In view of the breaking up of the Southwestern Association and the competition for freights between Chicago and St. Louis and Missouri River points, the following circular has been issued:

"Commencing on the 15th of April, and until such time when rates are permanently established again west of Chicago and St. Louis (of which due notice will be given), all freight from seaboard cities and New England destined for Missouri River points (Kansas City, St. Joseph, Leavenworth and Atchison), will be billed at the full proportion of the established through rates to St. Louis, Hannibal and Chicago only, without giving or guaranteeing a through rate to point of destination, except in case of shippers demanding such through rate, when the present full tariff rate will be inserted in bill of lading.

"Freight will be billed by the route by which it is directed, the order to divert Missouri River freight is for the present suspended, but the division of this freight between the lines east of the Mississippi River and Chicago will be carried out as per existing agreement.

"For the Trunk Lines,
"ALBERT FINK, Commissioner."

The Detroit River Crossing and the Relations of the Michigan Central with the Canada Railroads.

Mr. James F. Joy, whose position as President of the Michigan Central for so many years gives special value to his opinions, made the following reply to a reporter of the Detroit *Post and Tribune*, who asked him if he thought that a bridge or tunnel could be maintained at Detroit, which would maintain the great east and west line of travel through that city:

This question covers the whole case, and will require an expression of opinion upon all the difficulties involved, both in building the crossing and its command of business afterward. I must admit frankly that this has now become a very unpleasant question for those who have the interests of the city at heart, in which respect I am second to no other within its limits. It may be considered certain, I think, that the construction of a tunnel at Grosse Isle will be undertaken, and, in my opinion, it will be successful.

It is of no use for us to try to shut our eyes to this fact. The purchase of the Canada Southern and the Michigan Central railroads by Mr. Vanderbilt, is enough to remove any doubt we might desire to retain upon that subject. His interest in having the crossing there has become immense, and he has no interest in having it here. There the business of southwestern roads can best cross the river. A tunnel or bridge can be made cheaper there than at this point. He commands the great thoroughfare, the Michigan Central road, whose business is necessary to give value to a tunnel or bridge here as there. Our position here is weakened by the whole influence and strength of that road in favor of the Grosse Isle route. Its business will largely go there, as the roads now are, and give value to money invested in a tunnel there. Our difficulty here is that a bridge or a tunnel will be just as much less valuable as that will become more valuable by the diversion of business. Add to these considerations that a road constructed from Ypsilanti to Trenton will shorten the line by that road 20 miles, and the weight on the side against us here is a very heavy one for us to overcome. But even all that, if it was all, would not make the case of a bridge or tunnel here desperate. If a convenient crossing by either could be made here the route through Detroit could still maintain itself against all these adverse influences. A railroad works for business. It cannot afford to quarrel with allies. The Great Western is in existence and is a most excellent road. It has a connection with the Erie, it will have such power that the owners of the Michigan Central and Canada Southern cannot afford to attempt to shut it out from competition for all business in the West. It can do them more damage in a warfare than they can be benefited by discriminating against it. There are other considerations which will have weight with the owners of these roads. The necessities of the Great Western and Grand Trunk will make them friends, and both together could easily obtain another road from Detroit to Chicago, availing themselves largely of roads already built. It is not for the interests of the owners of the other lines from Chicago to New York to drive them to do this, but rather to treat them so that they will not do it. I believe yet that arrangements will be made, as they certainly ought to be made, between the Michigan Central on one side and the Great Western and Grand Trunk on the other, so that there shall be harmony between them, and the business east and west of both the Canada lines pass over the Michigan Central road. I am sure this is the interest of all parties, and I believe their interest will bring them together. But, in any event, with a good crossing at Detroit, the Great Western could command a good share of the business. The great difficulty is to get such a crossing. It is clear that if a bridge or a tunnel can be built and is built, no ferry can or ought to be maintained for the business of any of the roads coming into Detroit from the west or north. The business must be done by way of the bridge or tunnel. It must be so located as to connect easily with the Michigan Central grounds, and form a continuous line with that road through its station grounds in the city. It must also conveniently reach the business of the Detroit, Grand Haven & Milwaukee road. How can it be located so as to be reached conveniently by the Great Western Company, the business of the city and these roads?

* * * * * * *

These difficulties of route are very great, and are one of the obstacles in our way to either bridge or tunnel.

If these difficulties can be overcome, then shall it be a bridge or a tunnel? The location at Belle Isle would obviate one objection to a bridge, which was urged to the one proposed to cross at the foot of Second street. It would be above and out of the harbor. The vessel men are in the way of *any bridge*, and an act of Congress is necessary before it can be built.

The bridge, if these difficulties were out of the way, would be very greatly preferable to the railroads and the public, and would cost much less money than a tunnel. The tunnel could be built without an act of Congress, but is a very difficult work, and likely to be expensive.

In any plan to cross the river, the Great Western Railroad Company is an important factor. It is to be as much benefited as any other interest, and much more so. It should contribute very largely, by money or credit, to do the work.

How shall the rest be raised, supposing that company by money or credit does its full share? In my experience, the most difficult part of building a railroad or a bridge, and I have built several of each, is in getting together the money with which to do it. The same will be found true of a tunnel. This is a very formidable difficulty. Can this and all others be overcome?

The importance of a crossing here can even now be hardly overestimated. It would still hold a great thoroughfare for all business through the city. It would still enable all Michigan roads to make it the terminal point for all their business and hold them here. It would enable the buyers of grain and produce of all kinds to compete here successfully for all that kind of business as in the past. A convenient and good crossing here is even more important now than at any time before, both for the city and the state. To be without it when one is established elsewhere is to surrender entirely the large advantages we have heretofore had, and consent to be side tracked, with all the disadvantages of being placed wholly one side of all the great highways upon which the business and travel of the world will pass and repass.

Resignation of Major B. S. Henning.

On the announcement that Major B. S. Henning, Genera Superintendent of the Missouri River, Fort Scott & Gulf Railroad Company, had resigned his position the employés assembled at the company's shops and adopted the following resolutions:

"*Resolved*, That it is with profound regret that we learn of the resignation of Major B. S. Henning, so long General Superintendent of this company, and that in losing him a landmark has gone from our midst.

"*Resolved*, That while his discipline has been strict and at times appeared severe, yet we realize that his decisions have been just and though firm have been tempered with kindness.

"*Resolved*, That we have always felt an interest in our road and have pointed with pride to its condition while under his care, and to the fact that its obligations to us have been met promptly.

"*Resolved*, That in losing him we lose an efficient officer who ever guarded the interest of his employers and employés, without regard to popularity, fear or favor, and who, while he held every one to a strict accountability for the performance of his duties, yet gave to every one the credit which was due, and taught us to feel that so long as our duties were faithfully performed our services would be appreciated.

"*Resolved*, That we extend to him our heartiest good wishes for his success in whatever field of labor he may be called.

"*Resolved*, That these resolutions be printed in the Kansas City *Times*, the Kansas City *Journal*, the *Railroad Gazette* and the *Railway Age*, and a copy to Major B. S. Henning."

The employés of the Leavenworth, Lawrence & Galveston road also met at the company's shops and adopted the following:

"*Resolved*, That we learn with the deepest regret of the resignation of Major B. S. Henning, who has so long and ably discharged the duties of General Superintendent of this company, and that in losing him we lose an efficient officer and tried friend.

"*Resolved*, That we *do*, and always *have*, felt a deep interest in our road's property, and while our Superintendent represented it *officially*, we at all times felt that under his able, solid and business-like management the interests of all were secure.

"*Resolved*, That we feel we are losing an officer whose business tact is unquestioned; whose promptness and strict, unswerving discipline have secured a thorough and efficient management of detail seldom seen in a road so young as ours; and though his strictness is proverbial, it has always been tempered by considerate justice.

"*Resolved*, That these resolutions be published in the Kansas City *Times*, Kansas City *Journal*, Ottowa *Journal*, *Railroad Gazette* and *Railway Age*, and that a copy be forwarded to Major B. S. Henning, indorsed by the Chairman and Secretary of this meeting as a testimony of our highest regard and esteem, and that we wish him every prosperity."

Safety to Train and Yard-Men.

The committee appointed last year by the Master Car-Builders' Association "to investigate the causes of accidents to train men and report what means can be provided to protect them and yard-men from injury, while in the performance of their duties," have issued the following circular, which is addressed "To Yard and Train-Men:"

"The undersigned were appointed a committee at the last annual meeting of the Master Car-Builders' Association, held in June, 1878, to ascertain and report at the next meeting of that Association, if anything can be added to or left off of freight cars with a view of better protection to yard and freight-train men while engaged in the performance of their duties. Any suggestions relating to draw-bars, dead-woods, steps, brake-wheels, running-boards, etc., will be gladly received.

"State what in your experience you know to be the most fruitful source of accidents to men in your positions, and what in your judgment will best remedy them.

"Address your replies to John Kirby, Master Car-Builder, Lake Shore & Michigan Southern Railway, Cleveland, Ohio, not later than the second week in May."

JOHN KIRBY,
J. H. F. WEIRS,
A. STEINBRUNNER, } Committee.

American Society of Civil Engineers.

Under date of March 31, 1879, the following circular has been issued:

DEAR SIR: It is intended at the approaching annual convention of the Society in June, to present, as far as practicable, a summary of engineering progress during the past one or two years.

Will you therefore send, addressed to the Secretary, a statement of the progress or completion within the past two years of engineering works with which you have been connected, with such description of them as will afford the information requisite for compiling the record alluded to.

The most interesting material for publication in our *Transactions* is the record of work actually done, and we would therefore be glad to have this information as fully as you may find practicable to give it.

Should you desire to take a longer time for the fuller record we would be glad to have you do so, sending directly the material for an abstract.

It is requested that answers to this communication may be forwarded to the Secretary not later than May 1, 1879.

Very truly yours,
(Signed) ALBERT FINK,
Vice-President and Acting President.
JOHN BOGART, Secretary.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Hanover Junction, Hanover & Gettysburg, annual meeting, at the office in Hanover, Pa., May 12, at 9 a. m.

Michigan Central, annual meeting, at the office in Detroit, May 8, at 10 a. m.

Railroad Conventions.

The *Car Accountants' Association* will hold its annual convention at the Grand Pacific Hotel, Chicago, April 23.

Master Mechanics' Association, annual convention, at the Grand Hotel in Cincinnati, May 13.

The *Passenger Conductors' Life Insurance Association* will hold its eighth annual convention in Philadelphia, May 21.

The *Master Car-Builders' Association* will hold its annual convention at the Grand Pacific Hotel, in Chicago, beginning on Tuesday, June 10.

The *American Society of Civil Engineers* will hold its eleventh annual convention in Cleveland, O., beginning June 17.

Dividends.

Dividends have been declared as follows:

Panama, 3 per cent., quarterly, payable May 1.

Foreclosure Sales.

The *St. Louis & Southeastern, Tennessee Division*, was sold in Nashville, Tenn., April 9, under a decree of foreclosure granted by the United States Circuit Court. The sale included 37 miles of road from Guthrie to Edgefield Junction, and part ownership of 10 miles from Edgefield Junction to Nashville. The road was bought for $725,000 by C. W. Opdyke, of the bondholder's committee, acting under the agreement by which ownership of the road is to pass to the Louisville & Nashville Company, which has already been fully explained.

The *Indiana North & South* road was sold in Indianapolis, April 7, under a decree of foreclosure granted by the United States Circuit Court, and bought for $10,000 by A. J. Dull, for account of the Lochiel Iron Works, of Harrisburg, Pa., holder of nearly all the bonds. The property includes 13 miles of finished road from Attica, Ind., to Veedersburg, with some graded road-bed and some coal lands. There are $486,000 bonds outstanding.

The *Titusville & Petroleum Centre* road was sold at Petroleum Centre, Pa., April 12, by the Sheriff of Venango County, and bought for $3,066, by J. D. Hancock, for account of the Receiver of the Pennsylvania Transportation Company. The road was intended to connect the two places named and was all graded, but no rails were ever laid.

The *Painesville & Youngstown* road was offered at foreclosure sale in Cleveland, O., April 4, but no bids were received and the sale was indefinitely adjourned. The road is of 3 ft. gauge, and extends from Painesville, O., to Youngstown, 62 miles.

The *Philadelphia & Atlantic City* road will be sold in Camden, N. J., May 29, by order of the Chancellor of New Jersey, under proceedings in insolvency. The road is of 3 ft. 6 in. gauge, and 54 miles long, from Camden, N. J., to Atlantic City.

Master-Mechanics' Convention.

Mr. J. H. Setchel, the Secretary, issues a circular announcing that the twelfth annual meeting of the American Railway Master-Mechanics' Association will be held on the 13th, 14th and 15th of May, 1879, at the Grand Hotel, in the city of Cincinnati. This magnificent hotel has been selected as head-quarters, where the members and their families will be entertained at $2.50 per day. Those intending to be present will confer a favor upon the committee by sending their names to the Chairman as early as possible, that rooms may be reserved for them. The committee consists of J. H. Setchel, James Eckford, S. S. Pilson. Those wishing rooms will address J. H. Setchel, Cincinnati, O.

Southwestern Railway Association.

At the regular monthly meeting in Chicago, April 12, the business before the Association was the percentage of business to be allotted to the Chicago & Alton's new Kansas City line. The St. Louis roads announced their opposition to allowing the new road any share of the Kansas City-St. Louis business and rejected all propositions for a division, and also an offer to submit the whole question to arbitration. Finally, the Association was formally dissolved, and a proposition to renew the pool in another form was also rejected, the St. Louis roads and the Wabash refusing to continue the old agreement or to enter into any new one.

After the Association was dissolved and the meeting closed, another meeting was held, at which were present the representatives of the three Chicago roads—the Chicago & Alton, the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific—and also the Hannibal & St. Joseph and the Kansas City, St. Joseph & Council Bluffs. They agreed to continue the division of the Missouri River business to Chicago, and to unite in all measures which might be necessary to meet the competition of the St. Louis roads. Mr. J. W. Midgley, Commissioner of the late Association, was appointed Commissioner of this new pool.

Railroad Commissioners' Convention.—Committee on Uniform Accounts and Returns.

The Committee on Uniform Accounts and Returns, appointed at the Conference of Railroad Commissioners, held in Columbus, O., and the experts and accountants invited to act with them, will hold a meeting at the St. Nicholas Hotel, New York, April 24, at 10 a. m. The Committee consists of Commissioners Woodruff, of Connecticut; Boyne, of Illinois; Carter, of Virginia; Woodruff, of Iowa, and Turner, of Wisconsin. The experts are Messrs. M. M. Kirkman, C. P. Leland, G. S. Ford, W. P. Shinn and Wilbur.

Southern Railway & Steamship Association.

A called meeting of this Association assembled at the Kimball House, Atlanta, April 17, to consider the recent freight troubles. There were present the following:

J. E. Brown, President; Virgil Powers, General Commissioner, and Charles A. Sindall, Secretary Southern Railway & Steamship Association.

Wm. MacRae, Western & Atlantic.

E. W. Cole, G. R. Knox, Wallace McPherson and —— Edwards, Nashville, Chattanooga & St. Louis.

G. J. Foreacre and R. D. Carpenter, Atlanta & Charlotte Air-Line.

A. S. Buford, T. M. R. Talcott and Sol Haas, Richmond & Danville and Charlotte, Columbia & Augusta.

D. C. Wilson, R. G. Fleming and J. S. Davant, Port Royal & Augusta.

L. P. Grant, A. J. Orme, Atlanta & West Point.

E. G. Ghio, Seaboard & Roanoke, Raleigh & Augusta Air Line and Bay Line.

E. P. Alexander, J. S. Hamilton and W. W. Clarke, Georgia Railroad.

R. R. Bridgers and A. Pope, Wilmington & Weldon and Wilmington, Columbia & Augusta.

C. L. Schlatter, Brunswick & Albany.

E. B. Stahlman, Louisville & Nashville.

Cecil Gabbett, Western of Alabama.

H. M. Cottingham, St. Louis & Southeastern.

Frank Huger, Atlantic, Mississippi & Ohio.

F. W. Clarke, Carolina Central.

W. G. Raoul, Southwestern, Central and Savannah, Griffin & North Alabama Railroad.

G. J. Forcacre, Northeastern of Georgia.

John B. Peck, South Carolina Railroad.

W. M. Wadley and William Rogers, Central of Georgia.

H. S. Haines, Atlantic & Gulf.

George W. Adams, Macon & Brunswick.

J. B. West, Baltimore & Savannah steamships.

William Plummer, Merchants' & Miners' Transportation Company.

William H. Stanford, Old Dominion Steamship Line.

Thomas Pinckney, Virginia & Tennessee Air Line.

James R. Ogden, East Tennessee, Virginia & Georgia.

Ray Knight, Selma, Rome & Dalton.

After the call of the roll, on motion the President appointed the following committee to investigate the causes of the recent cutting of through freight rates, and to report the result of their investigation to the Association: E. W. Cole, L. P. Grant, E. P. Alexander, J. B. Peck and E. B. Stahlman.

The Association transacted none but routine business while awaiting the report of the committee. The committee took a large amount of testimony as to the first cutting, most of it contradictory.

On the second day the committee made a report, in which they do not blame any one in particular, but say that there have been violations of regulations which are to be deeply regretted, and which, it is hoped, will not occur again. Although criminations have frequently been made the committee accuse no one. They recommend a charitable view of the various shortcomings which are acknowledged to have existed. The report was adopted, and the Association also adopted a resolution which firmly reëstablished the old rates and expressed a desire that they should be maintained. The Association then adjourned, to meet the second Wednesday in August at Greenbrier White Sulphur Springs, Virginia.

Southern Association, General Passenger & Ticket Agents.

A regular meeting of this Association was held in Atlanta, Ga., April 10, with a full attendance. President H. M. Drane presided, with W. B. Danley as Secretary.

The Committee of Passenger Rates presented a report, which was adopted after a little discussion. The new rate sheet presented makes a general reduction in through rates; the fare from New Orleans to New York is cut down from $42 to $36 and other points in proportion. The Association, after transacting some routine business, then adjourned.

General Time Convention.

The General Time Convention met in Louisville, Ky., April 9. Sixty delegates were present; General Superintendent A. A. Talmage, of the Missouri Pacific, was chosen Chairman, and Mr. W. F. Allen, of the *Official Guide*, was Secretary. Only the usual routine and committee work was done, and it was decided to continue the present schedules in force. The Windsor House, New York, was appointed as the place for the fall meeting in October next.

ELECTIONS AND APPOINTMENTS.

Ashtabula & Pittsburgh.—Mr. W. H. Linton has been appointed Road-Master, and will have his office at Ashtabula, O.

Colorado Western.—The first board of directors is as follows: E. L. Berthoud, O. H. Henry, John C. Hummel, W. A. H. Loveland, Foster Nicholas, Thomas I. Richman, Dennis Sullivan, Joseph A. Thatcher, C. C. Welch.

Corning, Des Moines & St. Joseph.—The officers of this company are: President, D. G. Single; Vice-President, L. E. Darrow; Secretary, W. B. Anderson; Treasurer, C. C. Norton; Superintendent, O. J. King. Office at Corning, Ia.

Indiana, Bloomington & Western.—The directors of this new company, successor to the Indianapolis, Bloomington & Western, have chosen the following officers: President, C. P. Williams, Albany, N. Y.; Vice-President and Treasurer, Josiah B. Blossom, New York; Executive Committee, J. W. Peck, Chicago; C. P. Williams, Albany, N. Y.; Wm. Adriance, Poughkeepsie, N. Y.; J. L. Farwell, Claremont, N. H. J. B. Blossom, New York.

House Committees.—The following are the committees of the new House of Representatives which have relation to transportation or railroad affairs:

Pacific Railroads.—Messrs. McLane of Maryland, Chalmers of Mississippi, Bliss of New York, Clark of Missouri, Dickey of Ohio, Ellis of Louisiana, Martin of West Virginia, Wellborn of Texas, Harmer of Pennsylvania, Belford of Colorado, Newberry of Michigan, Bailey of New York, Butterworth of Ohio.

Commerce.—Messrs. Reagan of Texas, Bliss of New York, Ross of New Jersey, Kenna, of West Virginia, McLane of Maryland, Thomas Turney of Kentucky, Acklen of Louisiana, Beale of Virginia, Deuster of Wisconsin, Clardy of Missouri, O'Neill of Pennsylvania, Waite of Connecticut, Henderson of Illinois, Townsend of Ohio, Russell of Massachusetts.

Public Lands.—Messrs. Converse, of Ohio, Wright of Pennsylvania, Steele of North Carolina, McKenzie of Kentucky, Williams of Alabama, Hull of Florida, Ketcham of New York, Ryan of Kansas, Sapp of Iowa, Washburn of Minnesota, Bennett of Dakota.

Post Offices and Post Roads.—Messrs. Money of Mississippi, Clark of New Jersey, Cook of Georgia, Evins of South Carolina, Singleton of Illinois, Shelly of Alabama, Jones of Texas, Ketcham of New York, Joyce of Vermont, Stone of Michigan, Bingham of Pennsylvania.

Railways and Canals.—Messrs. Cabell of Virginia, Shelly of Alabama, Kimmell of Maryland, Siemons of Arkansas, Wise of Pennsylvania, Oscar Turner of Kentucky, O'Reilly of New York, Fisher of Pennsylvania, Blake of New Jersey, Houck of Tennessee, Ford of Missouri.

Patents.—Messrs. Vance of North Carolina, Smith of Georgia, Aiken of South Carolina, Townshend of Illinois, Bachman of Pennsylvania, Talbot of Maryland, Smith of New Jersey, Ward of Pennsylvania, Caswell of Wisconsin, Ballou of Rhode Island, Dwight of New York.

Levees of the Mississippi.—Messrs. Robertson of Louisiana, Chalmers of Mississippi, Johnston of Virginia, Oscar Turner of Kentucky, Myers of Indiana, Evins of South Carolina, Dunn of Arkansas, Bayne of Pennsylvania, Boyd of Illinois, Caswell of Wisconsin, Prescott of New York.

International & Great Northern.—At the annual meeting in Palestine, Tex., April 7, the following directors were chosen: Ira H. Evans, H. M. Hoxie, D. S. H. Smith, Palestine, Tex.; James A. Baker, Houston, Tex.; John Sealy, Galveston, Tex.; John S. Barnes, Thomas W. Pearsall, Samuel Sloan, Moses Taylor, New York. The board reelected Samuel Sloan, President; H. M. Hoxie, Vice-President and General Superintendent; Ira H. Evans, Secretary; D. S. H. Smith, Treasurer; Jacob S. Wetmore, Assistant Secretary and Assistant Treasurer.

Kansas City, Fort Scott & Gulf.—The officers of this Company, successor to the Missouri River, Fort Scott & Gulf, are: President, H. H. Hunnewell, Boston; Secretary and Treasurer, Charles Merriam, Boston; General Manager, George H. Nettleton, Kansas City, Mo.; Land Commissioner, John A Clark, Kansas City, Mo.; General Superintendent, T. F. Oakes, Kansas City, Mo.; Auditor, J. S. Ford, Kansas City, Mo.; Cashier, J. H. Aldrich, Kansas City, Mo.; Purchasing Agent, G. W. P. Atkinson, Kansas City, Mo. The officers are the same as those of the Kansas City, Lawrence & Southern, and the two roads will be worked togethes.

Kansas City, Lawrence & Southern.—The officers of this company, successor to the Leavenworth, Lawrence & Galveston, are as follows: President, H. H. Hunnewell; Secretary and Treasurer, Charles Merriam; General Manager, George H. Nettleton; Land Commissioner, John A. Clark; General Superintendent, T. F. Oakes; Auditor, J. S. Ford; Cashier, J. H. Aldrich; Purchasing Agent, G. W. P. Atkinson. The offices of the President and the Secretary and Treasurer are in Boston; those of all the other officers in Kansas City, Mo. The road has the same officers as the Kansas City, Fort Scott & Gulf, and the two will be worked together.

Lake Erie & Louisville.—The following officers have been elected for the ensuing year: President, Charles Foster; Vice-President and Counsel, C. S. Brice; Secretary and Treasurer, W. H. Andrews; General Superintendent, I. H. Burgoon. Mr. Foster succeeds Mr. James B. Hodgskin, deceased.

Minneapolis & Northwestern.—The board has reëlected D. Morrison, President; J. K. Sidle, Treasurer; George B. Wright, Secretary.

New York City & Northern.—The officers are: President, Robert M. Galloway; directors, Philo C. Calhoun, Alfred Lichtenstein, Grosvenor P. Lowrey, Lewis May, Benjamin Odell, George H. Roberts, Joseph Seligman, Thomas R. Sharpe, Charles F. Woerishaffer.

Northern Central.—The office of General Western Freight Agent having been abolished, Mr. S. L. Seymour has been appointed Freight Agent at Buffalo. The appointment to take effect from April 1, 1879. Mr. Seymour is joint agent

holding the office of Western Passenger Agent, in addition to Freight Agent.

North Wisconsin.—At the annual meeting in Hudson, Wis., April 12, the following directors were chosen: John A. Humbird, Hudson, Wis.; E. P. Sawyer, Philetus Sawyer, Oshkosh, Wis.; R. R. Cable, Rock Island, Ill.; W. H. Ferry, H. H. Porter, Chicago; Jacob Humbird, Baltimore; David Dows, Roswell P. Flower, New York. The board elected Philetus Sawyer President; John H. Humbird, Vice-President and Treasurer; W. H. Phipps, Secretary.

Old Colony.—A circular announces that on and after April 14, the office of S. A. Webber, Assistant Superintendent Northern Division, will be located at Fitchburg, Mass. A. B. Peters is appointed Agent at South Framingham, and S. W. Huntley, Agent at Fitchburg.

Port Dover & Lake Huron.—A circular announces that the following changes have been made in the officers of this railway:

Mr. A. D. Wright, General Manager, having resigned, the office has been abolished. Mr. A. B. Atwater, Superintendent, will have charge of all employés (excepting the Treasury Department), who will receive his orders and regard them accordingly. He will also have charge of the car mileage. Mr. C. N. Scott, General Freight and Passenger Agent, also assumes the the duties of Treasurer and will have charge of all the accounts of the company. All reports should be sent to him, and all drafts for balances for freight, mileage or passenger accounts due other companies should be made upon him. Mr. R. W. Sawtell remains only as Secretary, and all matters pertaining to bonds, stock, real estate and taxes should be referred to him.

South Carolina.—At the annual meeting in Charleston, April 9, the following directors were chosen: W. J. Magrath, Louis D. DeSaussure, Andrew Simonds, Francis J. Pelzer, W. A. Courtenay, J. B. E. Sloan, Moses Taylor, William L. Trenholm, John Hanckel, George W. Williams, James S. Gibbes, Samuel Sloan, J. P. Southern, Henry Gourdin, William B. Johnston. The board reëlected W. J. Magrath President.

Spencer.—At the annual meeting in Spencer, Mass., April 14, the following directors were chosen: Dexter Bullard, Abram Capen, James Capen, Erastus Jones, David Prouty, Charles N. Prouty, Isaac L. Prouty, Richard Sugden, J. W. Temple. The board elected David Prouty, President; Isaac L. Prouty, Vice-President; J. W. Temple, Clerk; Charles N. Prouty, Treasurer.

Wabash.—Mr. Cyrus W. Field has consented to accept the presidency of this company on the condition that as soon as he can find a thoroughly practical and trustworthy railroad man to take his place he may resign, and that all the suits that have been brought against the road by persons in New York, Ohio, Indiana, Illinois and elsewhere shall be contested to the full extent of the law, and should it be discovered that the suits have been brought for the purpose of depressing the securities and speculating in the bonds and shares of the company, that the promoters shall be prosecuted for conspiracy.

Western North Carolina.—At the annual meeting in Newton, N. C., April 4, the private stockholders elected the following directors: John S. Brown, John S. Henderson, J. W. Wilson. The other nine directors are appointed by the State.

PERSONAL.

—Col. Wm. Lord, formerly a large stockholder and for many years a director of the Rome, Watertown & Ogdensburg Company, died April 9 at his residence in Brownville, Jefferson County, N. Y. He was very active in the first construction of the road.

—Mr. R. Luttrell, late Superintendent of the Intercolonial road, was presented last week with very flattering testimonials and addresses from prominent citizens of Moncton, N. B., and from his fellow-members of the Methodist church there. Mr. Luttrell will soon leave Moncton for Montreal.

—Major John Edwards, who died in Paterson, N. J., April 11, aged 78 years, was one of the oldest locomotive builders of that city. Forty-eight years ago he was made foreman for the old firm of Godwin, Rogers & Clark, for whom he had worked several years as a journeyman, and he subsequently went into the firm of Danforth, Cooke & Co., of which the late Charles Danforth was head. When the firm was reorganized as a corporation under the name of the Danforth Locomotive & Machine Works, in 1865, Major Edwards was chosen Vice-President, and held that office until his death. He was almost the last survivor of the generation that built up the Paterson locomotive shops.

—Mr. C. J. Brydges, late General Superintendent of Government Railways in Canada, formerly General Manager of the Grand Trunk and at one time of the Great Western, has been appointed Governor of the Hudson's Bay Company, an office of considerable responsibility and profit.

—Mr. Wm. H. Swift, whose death was briefly noted last week, had done much and varied work in his time. Born in 1800, he graduated from West Point and was m de a lieutenant of artillery in 1821. After serving on the famous Lewis and Clark exploring expedition in the Northwest, he was made captain of topographical engineers, and for some time attached to the coast survey. In 1836 he was made Resident Engineer of the Western Railroad and superintended its location from Worcester, Mass., to Albany, afterward organizing the transportation department. After the completion of the road he was in government service again for a time and had charge of street improvements in Washington. From 1845 to 1849 he was President of the trustees of the Illinois & Michigan Canal, and in 1849 he was chosen President of the Philadelphia, Wilmington & Baltimore. In 1851 he returned to Massachusetts, having been elected President of the Western Railroad Company, after the death of Addison Gilmore. With this company he served three years, retiring in 1854, when Chester W. Chapin succeeded him. Soon afterward he went to New York and resided there till his death. He continued to take much interest in railroad matters, and was a trusted adviser of the Baring Brothers in their American railroad transactions, and represented them in the Iron Mountain board.

—Gen. Thomas T. Eckert has withdrawn his resignation, and will continue President of the Atlantic & Pacific Telegraph Company.

—Col. Bird W. Spencer, Treasurer of the New York, Lake Erie & Western Company was this week elected Mayor of Passaic, N. J., where he resides, after a heated contest.

TRAFFIC AND EARNINGS.

Freight Rates from Missouri River Points.

A lively war in freight rates has followed the dissolution of the Southwestern Railway Association. To meet cuts made by the St. Louis roads, the Chicago roads on Monday put the rates from Missouri River points to Chicago down to 10 cents per 100 lbs. for fourth class and 8 cents for grain, the old rates being 25 and 20 cents. It is said that a further reduction may be made, and rates are altogether unsettled.

Railroad Earnings.

Earnings for various periods have been reported as follows:

	1879.	1878.	Inc. or Dec.		P. c.
Three months ending March 31:					
Cairo & St. Louis	$51,660	$43,858	I.	$7,802	17.8
Cleve., Mt. Vernon & Del	83,288	86,795	D.	3,507	4.0
Ind., Bloom. & Western	264,096	319,981	D.	55,885	17.5
International & Great Northern	431,241	347,740	I.	83,501	24.0
St. Louis & S. E.	266,886	261,901	I.	4,985	1.9
Scioto Valley	65,737	44,903	I.	20,834	46.4
Two months ending Feb. 28:					
At., Miss. & Ohio	$231,345	$260,472	D.	$29,127	11.2
Net earnings	79,896	76,681	I.	3,215	4.2
International & Great Northern	309,144	247,615	I.	61,531	24.9
Net earnings	140,702	101,085	I.	39,617	39.2
Memphis, Paducah & Northern	28,580	34,161	D.	5,581	16.3
Net earnings	4,688	10,159	D.	5,471	53.6
Nash., Chatta. & St. Louis	315,312	333,577	D.	18,265	5.5
Net earnings	134,584	142,170	D.	7,586	5.3
St. Louis, Iron Mt. & Southern	673,190	716,839	D.	43,649	6.1
Net earnings	213,756	312,008	D.	98,252	31.5
St. Paul & Sioux City	84,689	81,808	I.	2,881	3.5
Net earnings	30,673	31,280	D.	607	1.9
Sioux City & St. Paul	42,672	54,084	D.	11,412	21.1
Net earnings	4,408	20,727	D.	16,319	78.8
Southern Minnesota	72,256	121,775	D.	49,519	40.7
Net earnings	38,358	68,283	D.	29,925	43.8
Month of January:					
Del. & Hudson Canal Co., leased lines	$296,148	$291,985	I.	$4,163	1.4
Net earnings	103,091	84,687	I.	18,404	21.7
N. Y., Lake Erie & Western	1,147,173	1,304,018	D.	156,845	12.0
Net earnings	185,142	344,225	D.	159,083	46.2
Month of March:					
Cairo & St. Louis	$19,551	$19,843	D.	$292	1.5
Cleve., Mt. Vernon & Delaware	29,803	30,427	D.	624	2.1
Ind., Bloom. & Western	80,587	106,504	D.	25,917	24.3
International & Great Northern	122,097	100,125	I.	21,972	22.0
St. Louis & Southeastern	95,175	93,209	I.	1,966	2.1
Scioto Valley	24,579	18,450	I.	6,129	33.1
First week in April:					
Chicago, Mil. & St. Paul	$156,000	$168,752	D.	$12,752	7.6
St. Louis, Iron Mt. & Southern	86,920	77,985	I.	8,935	11.5
Week ending April 4:					
Great Western	$83,572	$95,202	D.	$11,630	12.2
Week ending April 5:					
Grand Trunk	$154,223	$173,876	D.	$19,653	11.3

Grain Movement.

Receipts and shipments of grain of all kinds at the eight leading Northwestern markets, and receipts at the seven Atlantic ports, for the week ending April 5 have been, in bushels, for the past six years:

	Northwestern—		Atlantic.
Year.	Receipts.	Shipments.	receipts.
1874	2,623,377	1,626,790	2,279,409
1875	1,109,503	1,132,815	1,696,651
1876	1,896,720	1,640,133	1,520,130
1877	1,711,939	1,574,082	1,420,795
1878	4,022,086	3,836,491	4,609,220
1879	2,754,786	2,833,368	4,901,466

Last year (alone of the six) lake navigation was open during the week, and its effect was felt in immensely increased receipts and shipments at the Northwestern markets. Compared with other weeks this year, Northwestern receipts were the smallest of the year, Northwestern shipments a little smaller than in the previous week, but larger than in any other, while the receipts at Atlantic ports were the largest ever known in a single week while navigation was closed.

Of the receipts at Atlantic ports 34.7 per cent. arrived at New York, 25.4 at Baltimore, 19.4 at Philadelphia, 10 at New Orleans, 8.2 at Boston, 2.2 at Portland, and 0.1 per cent. at Montreal. New York's percentage is the smallest since the snow blockade in January, but still the quantity is considerably above the average of the year; Baltimore's receipts are the largest of the year, and, indeed, have been exceeded but twice in its history (both weeks last summer); Philadelphia's receipts are also the largest of this year, but were exceeded in six weeks last year. New Orleans (whose receipts fluctuate greatly from week to week) has had larger receipts but once before this year.

Shipments of Northwestern markets slightly exceeded their receipts, the first time this year, we believe. At the close of the week named there were about 23,000,000 bushels of grain in store at the leading Northwestern markets, which is as much as they had shipped during the preceding twelve weeks.

San Francisco receipts for the week ending April 5 were 14,562 barrels flour, 340,512 bushels wheat, 36,503 bushels barley and 6,047 bushels other grain; total, reducing flour to wheat, 455,872 bushels.

Coal Movement.

Anthracite tonnage reported for the week ending April 5 was: 1879, 405,161; 1878, 297,336; increase, 107,825 tons, or 36.3 per cent.

The actual tonnage passing over the Huntingdon & Broad Top road for the three months ending March 29 was as follows:

	1879.	1878.	Increase.	P. c.
Broad Top coal	33,229	32,932	297	0.9
Cumberland	41,955	9,800	32,155	328.1
Total	75,184	42,732	32,452	76.0

The division of the Cumberland coal traffic for the three months ending March 29 was as follows:

	1879.	1778.	Increase.	P.c.
Baltimore & Ohio R. R.	197,075	171,872	25,203	14.7
Bedford Div., Pa. R. R.	38,165	10,497	27,668	263.5
Total	235,240	182,369	52,871	29.0

The actual tonnage of anthracite coal passing over the Pennsylvania & New York road for the four months of its fiscal year from Dec. 1 to March 29 was: 1879, 265,204; 1878, 168,653; increase, 96,551 tons, or 57.2 per cent.

Iron and Ore.

Pittsburgh iron receipts for the year ending Dec. 31 were:

	1878.	1877.	Increase.	P. c.
Iron ore	299,856	230,476	69,380	30.1
Pig iron	250,476	243,178	7,298	3.0
Muck-bar, blooms, etc	68,774	23,961	44,813	186.7
Scrap	57,622	54,422	3,200	5.9
Total	676,728	552,037	124,691	22.6

The receipts for 1878 were the largest ever reported.

St. Louis Passenger Rates.

Reports have been current for several days of a fresh competition and cutting in east-bound passenger rates from St. Louis. It is said that tickets to New York have been sold for $12, with a prospect of going still lower.

Colorado Rates.

Later advices confirm the reported conclusion of an agreement between the Union Pacific, the Kansas Pacific and the Atchison, Topeka & Santa Fe for a division of the Colorado freight traffic and the maintenance of rates. The terms of the agreement are not made public.

THE SCRAP HEAP.

Railroad Equipment Notes.

The Woodruff Sleeping and Parlor Car Co. will have 10 of its coupé or parlor cars running this summer on the New York & Manhattan Beach road.

The Georgia Railroad shops at Augusta, Ga., have lately built a number of dump cars on a plan designed by Gen. E. P. Alexander, President of the road. They are so made that earth or ballast can be dumped alongside the track while the train is in motion.

The Diamond State Car Spring Co., of Wilmington, Del., lately shipped 1,000 of their Eureka springs to Sacramento, Cal.

The Mason Machine Works, at Taunton, Mass., have a considerable order for locomotives.

Billmyer & Smalls, at York, Pa., have orders on hand for 700 freight cars.

The Hinkley Locomotive Works, in Boston, are building two 21-ton narrow-gauge engines for the Profile & Franconia Notch road, and have several other orders on hand.

Mr. John C. McLaughlin, late foreman of the Pullman Palace Car Co.'s shops at Detroit, has engaged in the manufacture of a car-heating apparatus of his own design. He has an order from the New York Central.

The Philadelphia & Reading Coal & Iron Co. has its new shops at Pottsville, Pa., nearly ready for use. They will build and repair mine cars and mining machinery.

The Baldwin Locomotive Works, in Philadelphia, are building 29 Consolidation engines to go to Australia. They have recently received orders from the New Jersey Central, the Atchison, Topeka & Santa Fe, the Louisiana Western and the Northern Pacific roads.

Iron and Manufacturing Notes.

The St. Albans (Vt.) *Messenger* says of the settlement just made by the St. Albans Iron & Steel Works: "The terms are very much as heretofore published, and may be briefly restated as follows: The Silicon interest has been settled by taking what they claimed belonged to them in the first place, *i. e.*, they take $80,000 in the common stock, and $20,000 is stayed for five years. The debts, $120,000, are adjusted by the creditors taking the company's notes, payable on or before five years from date, and the entire property is released from mortgage. * * * A working capital has been subscribed among the stockholders, ample (with the $50,000 of material on hand) for present needs, and the same will be called when required."

The new mill in the Springfield (Ill.) Iron Company is in L shape, the rail-mill end being 344 ft. long and 82 ft. wide, except for a distance of 88 ft., where it is widened to 107 ft. The puddle-mill end is 162 ft. long and 72 ft. wide. The building is of brick, the walls being 24½ ft. to the eaves. All the machinery has been overhauled and repaired.

The Philadelphia & Reading rolling mill at Reading, Pa., is making iron rails for the Northern Pacific.

Oswego Furnace, in Oregon, the only blast furnace on the Pacific Coast, turned out 1,500 tons of iron last year, and is preparing to do more this year. The furnace uses local ores and charcoal for fuel.

Woodstock Furnace, at Woodstock, Ala., has one stack in blast, and is preparing to blow in another.

The Indianapolis Rolling Mill is re-rolling a lot of iron rails for the Fort Wayne, Muncie & Cincinnati road.

The Atlanta (Ga.) Rolling Mill is running full double turn, and has orders ahead for 2,000 tons of charcoal head iron rails.

Bridge Notes.

Grant Wilkins & Co., of Atlanta, Ga., and No. 102 Broadway, New York, have secured contracts for a wrought-iron draw-span of 142 ft. over Three-Mile Creek on the Mobile & Montgomery road; a wrought-iron highway span of 100 ft. in Montgomery, Ala.; five wrought-iron spans, 120 ft. each, over Etowah River and six of 100 ft. each over Chattahoochie River on the Western & Atlantic road. Also for a centre or pivot pier for a draw-bridge near Mobile, Ala.

The King Iron Bridge Co., of Cleveland, O., has received the contract for an iron bridge over Jones River at Lebanon, Del.

The Morse Bridge Works, at Youngstown, O., are building an iron bridge with four spans of 150 ft. each over the Allegheny River at Franklin, Pa.

The contract for the Croton Lake bridge on the New York City & Northern road has been let to A. P. Boller, of New York.

Spikes.

The Kansas City, St. Joseph & Council Bluffs people have been much disturbed by a man who appears at intervals and insists that the road shall be delivered to him in trust for the Emperor of Germany. The officers say that he is worse than a patent-coupler man.

A friend wants to know why it is called a frog. Can any one give a reason?

Considering how very profitable narrow-gauge roads must be, according to their advocates, it seems strange that one 60 miles long should be offered for sale and not a bid made. Surely people don't know where wealth is to be looked for.

The opinion of the average passenger as to the speed of the train he is traveling on is generally about as definite as the size of a lump of chalk.

Peruvian Traffic.

During the construction of the roads over the Cordilleras, in Peru, much was said of the extraordinary difficulties overcome, and it was probably assumed that great objects were to be gained by such an enormous expenditure. But, though the roads have been completed, or partly completed, for several years, no reports are made of their traffic. But Mr. Adolph Bastian, in a German work recently published on the "Civilized Countries of Ancient America," says: "With the wildest prodigality the spirit of speculation was active, and, in order to do something for civilization, railroad construction was pitched upon, without the existence of any pressing necessity therefor. In the prosperous times nothing was saved, and the burden of the national debt is enormous, so that now capital is lacking to work the mines again, to utilize the roads that have been constructed, to produce raw materials and afford freight to the roads. Thus the cost of maintenance of the railroads, constructed with fabulous extravagance over the lofty Cordilleras (at the height of Mont Blanc) is a burden to the state, and most of them "do not even earn enough to pay for greasing the car wheels," so that the deficit increases continually. Many of these railroads are truly

miracles of the engineer's art, and in them difficulties have been overcome before which we would be frightened. The worst of it is, however, that most of them run through uninhabited deserts, the current of emigration does not follow them, as in the West of North America. A road leads from Arequipa on the Pacific Ocean over the Cordilleras to Puno, which lies on the uninhabited, cold, elevated plateau of Lake Titicaca. When I was there *one train a week* was dispatched, on which there was occasionally an Indian with a bag of potatoes in the fourth-class car. The cost of this road was $32,000,000."

Tests of French's Plumbago Oil.

The following very remarkable results have been obtained by some tests of plumbago oil made by Professor Thurston for the Plumbago Oil Company of Rochester, N. Y., a report of which has just been published by that company. In the tests for endurance an exactly equal quantity of oil was used in each test.

	Endurance.				*Relative
Name of oil.	Revolutions.	Feet traveled.	Value. per ct.	Gumming per ct.	value.
Winter-bleached sperm	114,106	39,823	100	10	100
French's plumbago	138,840	48,455	122	5	482
Prime lard	59,890	20,902	52	6	39
West Virginia	79,740	27,829	70	83	52
"No. 2" mixed black	64,820	22,622	57	..	41
Best reduced black	52,489	18,319	46	22	46
"No. 3" mixed black	47,180	16,466	41	12	31

* Endurance, friction and leakage combined; the leakage from the car-box in 200 miles run at a speed of 40 miles per hour was 19 per cent. for all the other oils, and 3.6 per cent. for French's plumbago oil.

Professor Thurston's report of these tests adds that these relative values should be increased or decreased a certain amount to allow for differences in tendency to gum and height of the burning point, but the degree of the effect of these two qualities is not definitely enough known. The burning points of all the oils named are above that specified by railroads, and their differences are so small that their lubricating value may be considered equal on that point. With regard to gumming, there is decided evidence of it in all the black oils and in the West Virginia, but their depreciation on that account cannot be stated in figures.

For cylinder lubricants the following results of tests were reported :

	Endurance.		
	Revolutions.	Feet traveled.	Relative value.
French's plumbago oil	138,840	48,455	232
Prime lard oil	59,890	20,902	100
Tallow oil	99,730	34,806	166

In testing for the presence of acid Professor Thurston found that after 24 hours' contact with copper, lard showed a slight but very appreciable amount of acid and tallow a considerable amount, while plumbago oil, after *two months'* contact, showed no acid.

Testing for suspension, he found no precipitation or separation of plumbago after the plumbago oil had been standing undisturbed for two months.

Old Time Railroading.

The Madison (Ind.) *Star* republishes from the Legislative documents for 1839-40 the following extracts from a report made by the Chief Engineer to Noah Noble, then Acting State Commissioner for the Madison & Indianapolis Railroad:

"Of the economy and propriety in every respect of using powerful engines, say as heavy as 12 or 13 tons for the burden trains on the Madison road, there can be no doubt. Not only can the transportation be performed cheaper, but the plan has the further advantage of requiring a small number of trips, by which the business can be better systematized, and the danger of collisions and interference with passenger cars proportionally lessened. The track should therefore be made very strong, and the cross-ties by placed at short distances (which in fact has heretofore been our plan) so that the road will bear heavy engines; and to promote this object and render the use of heavy engines still more safe, I would propose limiting the velocity of burden trains to about eight miles per hour, including stoppages, at which rate they can make the trip between daylight and dark.

"The length of the road is about 84 miles from the head of the inclined plane to Indianapolis. Columbus, which is the largest town, and will be the point of greatest business on the route, is just in the middle of the road. I would propose to make this the point of meeting and passing for all the trains, and would require every train passing the road in either direction, so to time their starting as to be at Columbus at 12 o'clock, without any possible failure, except in case of accidents. For this purpose I would lay down four tracks in Columbus for the distance, say 1,000 feet—the east track for the burden trains going from Madison, and the west track for the burden trains going toward Madison, leaving the two centre tracks open for the passage of the passenger trains. In the use of the road thus prepared, the the freight trains moving at the rate of eight miles per hour would require 11 hours to make the trip, and would leave the depot at each end of the road at half-past six in the morning. And if there be two trains in each direction, the first must start 15 minutes earlier than this. The daily passenger train, which would be drawn by a light engine of 9 or 10 tons, would travel at the rate of 16 miles per hour, allowing for stoppages on the way, requiring 5¼ hours to make the trip, including a few minutes' delay at Columbus, would leave the depot at each end precisely at 9 o'clock, a. m. So that both freight and passengers cars meet and pass each other at 12 o'clock. As there would in practice be some variations in time of arrival, it would be safe to anticipate fifteen or twenty minutes delay at the place of passing, during which time the passengers could dine, and the freight trains take in or put out any freight that might be required.

"Along the line of the road there will necessarily be a turnout once in five miles, for the accommodation of the way trade, so that in case two trains should by any accident or derangement meet elsewhere than at Columbus, one or the other must run back to the nearest turnout, which could not at most delay it more than ten or fifteen minutes. But this expedient should not be allowed except in case of unavoidable accident. The conductor of every train on the road should be under positive orders, not to be disregarded, to reach Columbus at 12 o'clock, and must regulate his time of starting and all his movements accordingly. Upon the exact compliance with this regulation depends the favorable working of the whole system, and the success of the plan. If this condition of the plan can be fulfilled, and all the trains can be mode to reach the meeting point at 12 o'clock, or within twenty minutes thereafter with certainty (except in case of accident), then it follows that there is scarcely any limit to the capacity of a well-located and well-constructed single-track railway on this route."

Testing Iron 60 Years Old.

Two specimens of the old iron taken from the Belvidere bridge, recently demolished, have been tested by order of City Commissioner Tegmeyer. Specimen No. 1 (wrought iron), length 11 1/16 inches, was elongated to 12 1/16 inches and broke only at a strain equal to 52,836 pounds to the square inch. Specimen No. 2, length 10¾ inches, elongated to 12⅛ inches, broke at a pressure of 61,880 pounds, equal to the best iron made at the present day. Another specimen was reduced ¼ inch and elongated from 9 to 9⅛ inches, and broke at a strain of 60,080 pounds. The bolts were placed in the bridge when it was built, 60 years ago. The tests were made by Mr. Wendell Bollman at his works.—*Baltimore Gazette, April* 11.

Raising a Bridge.

The Easton (Pa.) correspondent of the Philadelphia *Times* under date of April 10, says: "Since the erection of the Lehigh Valley Railroad bridge over the Delaware at this place, three years ago, it has been ascertained that the weight of the two iron spans which rest on the pier near the Jersey shore has caused the iron shoes in which the spans rest to sink about an inch, throwing the structure out of grade, with the certainty of a still greater depression, owing to the fact that the inside masonry of the pier is not as solid as the outside. To obviate this the bridge superintendent of the road had an iron plate cast, the edges of which were to rest on the solid stone of the pier. The casting was 12 feet long, 3 ft. 3 in. wide, with ribs 15 in. deep and a general thickness of 3 in., the whole weighing 7,000 pounds. This was taken to the bridge and lowered into position, the task being accomplished this afternoon. The iron spans weigh 180 tons each, and in order to elevate them hydraulic jacks were used. After the spans were elevated sufficiently the masonry was re-dressed and leveled, the huge plate placed in position and the spans were then lowered without the stopping of a single train. This is considered a great feat in engineering."

Indianapolis Railroad Christian Association.

The annual report of the Indianapolis Railroad Christian Association shows the total number of visitors and readers at the room, 2,631; number attending services in the room, 6,901; attending weekly cottage meetings, 638. There are 57 members. The following are the officers for the ensuing year: George B. Wright, President; W. N. Jackson, Treasurer; George W. Cobb, Secretary and Agent; C. C. Gale, V. T. Malott, P. Pease, S. Frazier, S. Frazee, George B. Wright and W. N. Jackson, trustees.

His Bumper.

It would not be truth to say that twenty-five men per week walk into the railroad office of Detroit with a patent coupler, patent platform, patent bumpers, patent brakes and patent something else, which they wish to sell to some company for half a million. No, the number isn't over fifteen per week, but it is steadily growing. They keep an old platform car at the Union Depot for the benefit of these inventors. Whenever one appears they give him leave to attach his patent to that car and give it a trial. The car has been overhauled so much that hardly any part of the original structure remains, and it had only been side-tracked the other day after a trial of a patent brake, which broke nothing but the inventor's shins, when along came a queer old coon from up north with a patent bumper. He took of his hat and said they would out-bump anything on earth. He shed his overcoat and remarked that they would save the lives of 500 brakemen per year. He fell into a chair and asserted that they exercised and economical influence on the engine, held a moral lever over the brakemen, and assured a five per cent. dividend to stockholders. They tried to make him believe that his patent was 1,000 years old, and that his invention was meant to apply to milk cans and beer wagons, but they couldn't discourage him a bit. As a last resort he was given the old car. He put a carpenter and blacksmith at work, and in three days he was ready for trial.

"What I claim for this 'ere invention," he exclaimed as all was ready, "is that it will save human life till you can't rest, and now let her perform."

She performed. An engine was attached and the old car drawn out. The inventor stood right up to what he asserted. He said that a man between two cars provided with his patent bumpers was as safe as if in his own parlor, and when the car was backed down to a "freight," he was there to couple on. Those who didn't see him there soon heard of his presence. The bumpers were a success. They struck and jammed him so flat that his yells came forth as thin as old fashioned three-cent pieces, and seemingly no larger. When the car was hauled away the inventor's vest buckle was found under his chin, and his silver watch down his left boot leg, and he was about as flat up and down as a plank. It would have been impossible to tell the front side from the back side but for the forethought of a small boy who picked out the side the arms were attached to and called that the front side. They took the mass over to a cheap hotel, and it is there yet. Some of the flatness has disappeared, and "it" can speak a few words, but long weeks will pass before that particular inventor will drop his old white hat on the table of another railroad superintendent.—*Detroit Free Press.*

Rough on the Master Mechanics.

The Master Mechanics' Association this year will hold its annual convention in Cincinnati, of which goodly city Mr. Setchel, the efficient Secretary, is an honored resident. Probably no one is better acquainted with the character of the members of that Association than the said Secretary. It is therefore not a little significant that before the meeting of the Association in that place, he should, as was announced last week, have himself elected Police Commissioner. It may, therefore, be reasonably anticipated that the conduct of the members of that Association will this year be more than ordinarily circumspect.

Colors of English Locomotives.

A correspondent of the *English Mechanic* gives the colors which English locomotives are painted on the different lines in that country as follows: "London & Northwestern: black, name-plate red, lining French gray, red, and white and green. Great Western: green, lines yellow chrome shaded, frames burnt umber. Midland: light green, lining black and white. Northeastern: dark Brunswick green. Great Northern: grass green. Great Eastern: black, with ¼ in. vermilion lines. London & Southwestern: dirty yellow-brown. London, Brighton & South Coast: raw sienna, mixed with a little gamboge, and picked out with black and claret. North British: dark olive green, lining black. Caledonian passenger engines: ultramarine, black and white lining, with gilt lion of Scotland; mineral engines: olive green, black lines. Furness: red (vermilion ?) and lamp-black mixed. Mr. Maconnell, when on the London & Northwestern, used to paint his engines a rich red, which looked very handsome. Black is economical, does not show dirt (greasy) or the effect of heat, and is cheap. Most of the railways not named adopt Brunswick green. Perhaps the Great North of Scotland engines are the most elaborately painted of any, being lined with various colors, like a Highland plaid. The Caledonian blue looks very handsome, and is not so very expensive, ultramarine having great covering properties."

Bridge Mathematics.

To estimate what a bridge will cost any city if it is done by contract: Take the highest figures presented by any engineer and multiply them by the length of the bridge in inches, point off two places, and then add enough to prosecute any one who has anything to do with handling the funds, and the result is—that the bridge is an obstruction to navigation.—*Detroit Free Press.*

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe and the Denver & Rio Grande.—There has been much excitement in Denver over a reported attempt of the Denver & Rio Grande Company to take forcible possession of its road upon the ground that the Atchison, Topeka & Santa Fe has not conformed to the terms of the lease. The intention is also excused by a clause in the lease providing that the company may resume possession immediately upon any failure of the lessee to perform its part. There seems to be little doubt that the intention existed, though the attempt has not yet been made. The lessee has been running trains with an armed guard and has also guards posted to protect the shops and depots and to prevent interference with the graders in the Cañon of the Arkansas on the Leadville Extension.

In Denver, April 10, a *quo warranto* was filed against the Atchison, Topeka & Santa Fe Railroad Company by the Attorney-General of Colorado, in behalf of that state. The writ is returnable April 22, and is for the purpose of inquiring into the right of that company to operate leased lines in Colorado, as a corporation existing only under the laws of Kansas. The suit is brought at the instance of the Denver & Rio Grande.

Boston & Providence.—It is reported that negotiations are in progress for the consolidation of this company with the New York, Providence & Boston.

Central Vermont.—This company will this season run a through line of Tiffany refrigerator cars from St. Albans, Vt., to Boston, to accommodate the butter trade of Northern Vermont. A large refrigerator store-house is being built at the St. Albans depot, where butter can be stored for shipment.

Cherokee.—A correspondent writes us as follows of this Georgia road : "The Cherokee Iron Company, purchasers of the Cherokee Railroad, are now taking up that part of the track that was laid with 26-lb. rails, and are putting down 40-lb. charcoal-iron headed rails in their place. They have also contracted for 800 tons more of rails for the extension of the road. They are arranging to change the part of the road which is now of 5 ft. gauge to 3 ft. gauge, and will run the broad-gauge cars of connecting roads over their line by changing trucks at terminus. The new rails are being made by the Atlanta Rolling Mill."

Cincinnati Southern.—It is proposed in Cincinnati to organize a new company to lease and work this road as soon as it is finished to Chattanooga. The proposed company is to be organized with sufficient funds to buy all the necessary equipment and to serve as a working reserve.

Colorado Western.—This company has been organized to build a road from Breckenridge, Col., through the White River Valley to the Utah line.

Denver, South Park & Pacific.—This company has been advertising for bids for the grading of its road from Jefferson Creek, Col., in the South Park, to the Arkansas River near the mouth of Trout.

Detroit River Tunnel.—Detroit still continues to be much agitated about the crossing of the Detroit River at Trenton, as proposed by the Canada Southern, and people fear the diversion of business and a considerable loss of trade. A bridge over the river at Detroit will be strongly opposed by all the lake marine interest, and it is feared that a tunnel will be very costly. All parties seem to agree that some kind of crossing is necessary, but the question of ways and means is a difficult one, and the railroad companies do not seem disposed to join in the enterprise.

Elizabeth City & Norfolk.—The contractors are now at work grading this road through the low grounds of Camden County, N. C., and are preparing to build the bridge over the Pasquotank River. They are negotiating for the rails in Philadelphia.

Freeport & Monroe.—This company has filed articles of incorporation to build a road from Freeport, Ill., northward to Monroe, Wis., about 20 miles. The capital stock is to be $200,000.

Indianapolis, Bloomington & Western.—The bondholders who bought the Main Line of this road have organized the Indianapolis & Danville Company, in accordance with the laws of Indiana. They had previously organized the Pekin & Danville Company in Illinois. Subsequently meetings were held, at which it was resolved to consolidate the two companies. It was decided to call the new company the Indiana, Bloomington & Western Railroad Company.

Leavenworth, Lawrence & Galveston.—The following circular is dated Boston, April 2:

"The railroad and other property of the Leavenworth, Lawrence & Galveston Railroad Company, and of the Kansas City & Santa Fe Railroad & Telegraph Company, having been sold under a decree of the Circuit Court of the United States for the district of Kansas, and new companies organized by the purchasers of each respectively, and the same consolidated with each other, and with the Southern Kansas Railroad Company, under the name of the Kansas City, Lawrence & Southern Railroad Company, from and after this date all of the said three lines of railroad and other property will be operated and managed by said Kansas City, Lawrence & Southern Railroad Company."

The road has the same officers as the Kansas City, Fort Scott & Gulf. The property owned by the new company consists of a line from Lawrence, Kan., to Coffeyville, 144 miles, with branches from Olathe to Ottawa, 32 miles; from Cherryvale to Independence, 10 miles, and to Parker, 2 miles, making 188 miles in all.

Louisville Branch.—It is proposed to build a railroad from Louisville, in Jefferson County, Ga., southward to the nearest point on the Central Railroad, of Georgia, a distance of about 12 miles. The Central Company agrees to furnish the iron and work the road if the people on the line will grade it and supply the ties.

Missouri & Niobrara Valley.—On the 15th inst. Mr. Windom, of Minnesota, introduced into the United States Senate a bill to authorize the President of the United States to designate the Missouri & Niobrara Valley Railroad Company to construct the North Branch of the Union Pacific Railroad and Telegraph Line from Sioux City to the Union Pacific Railroad at, or westward of, Cheyenne within five years, under the terms and conditions of section seventeen of the amended Pacific railroad act of July 2, 1864.

Missouri River, Fort Scott & Gulf.—The following circular is dated Boston, April 2:

"The railroad and other property of the Missouri River, Fort Scott & Gulf Railroad Company having been sold under a decree of the Circuit Court of the United States for the district of Kansas, will hereafter be operated and managed by a new company, formed by the purchasers at such

sale under the name of Kansas City, Fort Scott & Gulf Railroad Company."

The road owned by the company is from Kansas City, Mo. to Baxter, Kan., 160 miles. The road has the same officers and will be worked in connection with the Kansas City, Lawrence & Southern.

Missouri & Western.—The St. Louis *Republican* of April 12 thus speaks of a suit affecting the stockholders of the Memphis, Carthage & Northwestern, to which this company is successor:

"The case of Edward Burgess, a railroad contractor of this city, against Joseph Seligman & Co., the eminent bankers of New York City, was up for hearing before Judges Dillon and Treat, in the United States Circuit Court yesterday. Plaintiff is a judgment creditor of the Memphis, Carthage & Northwestern Railroad Company, a corporation existing under the laws of Missouri, and said judgment was obtained for $73,670 in 1874, in the District Court of Cherokee County, Kan. With principal and interest it now amounts to about $80,000. In December, 1874, after the judgment was obtained, the railroad corporation was dissolved, leaving it unpaid. The petition alleges that the capital stock of the corporation consisted of 100,000 shares of $100 each, and that defendants in the firm named were at the time of the dissolution owners of 60,000 of said shares, of the nominal value of $6,000,000, and judgment is asked against them for the amount of the judgment rendered against the corporation by the Kansas court. The defendants say in their answer that they are not stockholders within the meaning of the law, but that they hold the stock as collateral for money advanced, and these are the issues the court has to try. The suit was originally brought in the St. Louis Circuit Court, but was transferred to the Federal court on the petition of defendants, who gave bond in $5,000, with Oliver Garrison as security. G.B. Drummond appeared as counsel for plaintiff and Hon. James O. Broadhead for defendants, this being his first appearence in a case in court since the accident to him a number of months ago. There are said to be many large claims existing against the defunct railroad corporation, enough in fact to take all of Seligman & Co.'s bonds to pay, provided this suit should establish the fact they are liable as stockholders. This may, therefore, be regarded as a test case, possessing an interest largely in excess of that which would attach to it individually, although is is for a large sum."

New Haven & Northampton.—At a special meeting in New Haven, Conn, April 15, the stockholders voted to authorize a mortgage on the road to secure $2,500,000 of new bonds, to be used only in retiring the existing debt of the company.

New York Central & Hudson River.—There is trouble between this company and the city of Rochester, N. Y., the City Council having ordered the enforcement of an old ordinance which prohibits the running of trains over eight miles an hour in the city limits and the switching or unloading of cars on the streets. Officers of the company say that it is not practicable to work the road under these restrictions. The object of the Council, it is said, is to oblige the company to raise its tracks through the city.

New York City & Northern.—Work is now in progress on this road, a contract for its completion having been let to Lewis Roberts, of Tarrytown, N. Y., who expects to have everything done by July 1. The road extends from High Bridge, at the northern end of New York City, to Brewsters on the New York & Harlem road, a distance of 53½ miles. Nearly all the grading was done several years ago and 23½ miles of track laid, 10 miles on the New York end and the rest on the northern end. At Brewsters the road will connect with the extension of the New York & New England. The road was originally the New York & Boston and afterward part of the New York, Boston & Montreal. The present company was organized by the bondholders who bought the road at foreclosure sale.

New York, Lake Erie & Western.—In the case of Woodruff, Trustee, against Jewett, Receiver, and the Erie Company, the New York Supreme Court has given a decision in favor of the plaintiff, who sought the enforcement of a contract with the Erie & Genesee Valley Company, under which the Erie agreed to lease that road and pay interest on its bonds, and to extend the road from Dansville, N. Y., southward to a junction with its line.

New York & New England.—The suit brought by the Boston & Providence Company to set aside the contract under which this company lately acquired possession of the Hartford, Providence & Fishkill road has been withdrawn.

New York & Oswego Midland.—The repair shops lately burned down at Middletown, N. Y., are to be replaced by solid brick buildings, upon which work is now in progress. The main shop will be 220 by 82 feet, with a transfer table running along the front, the pit being 200 by 50 feet. A round-house to hold engines is also under contract.

Northern Pacific.—A renewed effort is being made to secure from the present Congress an extension of the charter of this road, and to save the land grant.

North Wisconsin.—At the recent annual meeting it was decided to built another section of 20 miles this year and to begin work as soon as possible. If everything is favorable an additional 20 miles may be built.

Ohio & Mississippi.—It is said that the Reconstruction Committee have given up all hopes of the acceptance by the bondholders of any of the plans so far proposed. Nothing more will be done at present, but it is probable that arrangements may be made to foreclose the mortgages.

Paducah & Elizabethtown.—The following statement is made for the fiscal year ending Jan. 31, 1879:

Net earnings ($247 per mile)	$45,807.44
Balance from previous year	274.67
Total	$46,082.11
Taxes, improvements, etc.	$9,460.37
Interest and sinking fund, first mortgage	26,546.11
	36,006.48
Balance	$10,075.63

From this it has been decided to pay an interest-dividend of $8.80 per $1,000 bond on the second-mortgage bonds. This will require $10,042.56, and will leave a balance of $33 07 for the year.

Philadelphia & Reading.—The branch line from Harrisburg, Pa., to the Pennsylvania Steel Works at Baldwin is completed. It is 2¼ miles long and nearly a mile is trestle work. The highest embankment on the road is 13 feet, and the highest point of trestle-work 25 feet. The length of the bridge spanning the Pennsylvania Canal is 162 feet, and the height of the rails above the water 14½ feet. The entire road was completed in just 48 days from the time ground was first broken.

Pittsburgh & Lake Erie.—This company is said to be considering the question of building an extension of its road from Pittsburgh into the Connellsville coke region, to secure a share of the coke traffic.

Pittsburgh, New Castle & Lake Erie.—Surveys are being made for a branch from Harmony, Pa., northeast to Butler, to connect with the Parker & Karns City road.

Portland & Burlington Line.—Through cars began to run April 14 over the new line from Portland, Me., to Burlington, Vt., which is made up of the Portland & Ogdensburg from Portland to Fabyan, N. H.; the Boston, Concord & Montreal from Fabyan to Wells River, Vt.; the Montpelier & Wells River from Wells River to Montpelier, and the Vermont Central from Montpelier to Burlington. The distance from Portland to Burlington is 207 miles. Through connections will also be made by this line for St. Albans, Ogdensburg and Montreal.

St. Paul & Pacific.—The final decree of foreclosure and sale in the suit of Wetmore, Pearsall and Denny, trustees against this company, was last week submitted to the United States Circuit Court at St. Paul, Minn., and taken under advisement.

Shenandoah Valley.—The Clarke County (Va.) Circuit Court has granted a temporary injunction prohibiting the record of the mortgage for $2,500,000 executed by this company. The application for the injunction alleges that the Central Improvement Company (debtor to the complainants) was the holder of $1,000,000 of stock in the Shenandoah Valley Railroad Company; that the Central Improvement Company is insolvent, and was dissolved in 1874; that notwithstanding such dissolution its stock has been represented and voted in all the meetings of the stockholders of the Shenandoah Valley, and being a majority of the stock, it had controlled the action of all such meetings; that the effects of the Central Improvement Company, including its stock, was by the dissolution of the company transferred to its creditors, and therefore the attempt to vote it by the company was illegal and void, and that it was by this means that the contract with Satterlee & Co. was made, which, being at such an expense as to render entirely valueless the stock, ought not to be allowed.

Smithfield & Cape Fear.—Books of subscription to the stock have been opened for this company. Its charter provides for a railroad from the North Carolina road near Smithfield, N. C., southwest through Johnston and Harnett counties to some point on the Cape Fear River.

South Carolina.—At the annual meeting in Charleston last week there was a general discussion of the affairs of the company. Resolutions were passed directing the Chairman of the meeting to appoint a committee of stockholders to see if some plan could not be devised to settle the difficulties of the company and terminate the receivership.

Utah & Pleasant Valley.—Track is now laid on this road from the junction with the Utah Southern at Springville southeast through the Spanish Fork Cañon 21 miles. The road is intended to run to the Pleasant Valley coal mines, and will be about 60 miles long.

Vermont & Canada.—In the case of Codman and others against this company, the United States Circuit Court has given its opinion sustaining the validity of the company's indorsement on the $1,000,000 bonds issued by the Vermont Central trustees and known as the Vermont Central and Vermont & Canada guarantee bonds. This particular suit was brought to recover interest for one year. The case was not finally decided, but was put over to the May term to decide a question raised as to the rate of interest.

Wabash.—Counsel for this company have applied to the United States Circuit Court for an injunction to restrain certain parties from bringing action again in the state courts. It is claimed that the suits already brought are vexatious and only begun to embarrass the company.

In the suit of Holbrook against this company, the Court has decided to put the matter over until May 15, on account of the large number of suits now before it.

ANNUAL REPORTS.

Pennsylvania Company.

The following statements for the year 1878 have been published, showing briefly the operations of some of this company's leased lines, including all the important ones except the Cleveland & Pittsburgh, whose report is published separately. First among these in length and traffic is the

PITTSBURGH, FORT WAYNE & CHICAGO.

This road consists of a single main line from Pittsburgh to Chicago, 468.39 miles, with no branches owned. The New Castle & Beaver Valley, the Lawrence, the Ashtabula & Pittsburgh and the Northwestern Ohio, all branches, are leased and worked by the Pennsylvania Company in connection with this road, but their earnings are reported separately.

The general balance is as follows:

Stock ($54,238 per mile)		$25,383,585
Funded debt ($28,868 per mile)		13,500,000
Profit and loss		75,125
Total		$38,968,710
Road and equipment ($82,785 per mile)	$38,743,395	
Stock and bonds owned	213,315	
Materials, etc	12,000	
		38,968,710

The stock is guaranteed 7 per cent. dividends by the lessee. The work done was as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Passengers carried	2,253,731	2,096,131	I. 157,600	7.5
Passenger mileage	77,819,493	76,466,488	I. 1,353,005	1.8
Tons freight carried	3,026,250	2,690,735	I. 335,515	12.5
Tonnage mileage	637,470,506	439,998,281	I. 197,472,225	45.5
Average receipt:				
Per passenger per mile	2.79 cts.	2.33 cts.	D. 0.04 ct.	1.7
Per ton per mile	0.88 "	1.09 "	D. 0.21 "	19.2

The earnings for the year were as follows:

	1878.	1877.	Inc. or Dec.	P.c.
Passenger	$1,780,842	$1,779,498	I. $1,344	0.1
Freight	5,000,457	4,790,424	I. 810,033	16.9
Mail and express	287,074	245,710	I. 41,364	16.8
Miscellaneous	161,736	113,224	I. 48,512	42.8
Total	$7,830,109	$6,928,856	I. $901,253	13.0
Expenses	4,140,913	4,064,398	I. 76,515	1.9
Net earnings	$3,689,196	$2,864,458	I. $824,738	28.8
Gross earnings pr. mile	16,731	14,805	I. 1,926	13.0
Net earnings per mile	7,883	6,121	I. 1,762	28.8
Per cent of expenses	52.88	58.66	D. 5.78	9.9

Payments from net earnings were for interest and sinking funds, $1,059,800; dividends, $1,773,963; other purposes, $28,471; total, $2,862,234, leaving a profit of $826,962 to the lessee for the year.

OTHER LINES.

The other lines now reported are the Erie & Pittsburgh line from New Castle, Pa., to Girard, 81 miles, its trains running on the Lake Shore track from Girard to Erie, 18½ miles; the Indianapolis & Vincennes, a line from Indianapolis to Vincennes, Ind., 117 miles, and the Jeffersonville, Madison & Indianapolis, which has a main line from Indianapolis to Louisville, 111½ miles, with branches from Columbus to Madison, 45 miles; from Jeffersonville to New Albany, 6 miles, and from Columbus to Cambridge City, 62½ miles, making 225 miles in all. The Indianapolis & Vincennes was not leased directly until this year, but has always been controlled by the Pennsylvania and worked in its interest.

The capital accounts of these lines were as follows:

	Erie & Pitts.	Ind. & Vin.	Jeff., Mad., & Ind.
Stock	$1,998,400	$1,402,000	$2,000,000
Bonds	3,322,000	3,155,000	5,000,000
Bills and accounts	57,987	26,327	82,737
Profit and loss		148,274	
Total	$5,378,387	$4,726,601	$7,082,737
Road and equipment	5,076,662	4,665,449	6,508,712
Other assets, cash, etc	269,763	61,152	268,796
Profit and loss	31,962		305,229
Total	$5,378,387	$4,726,601	$7,082,737

The traffic for the year was as follows:

	E. & P.	I. & V.	J., M. & I.
Passengers carried	136,782	101,892	667,981
Passenger mileage	2,614,017	2,190,825	11,829,591
Tons freight carried	748,142	126,628	1,535,380
Tonnage mileage	43,550,000	9,674,974	46,502,460

The earnings for the year were as follows:

	E. & P.	I. & V.	J., M. & I.
Passengers	$79,755	$73,339	$329,615
Freight	441,747	194,101	740,908
Other sources	20,013	15,118	79,491
Total	$541,515	$282,558	$1,150,014
Expenses	383,913	277,209	727,026
Net earnings	$157,602	$5, 49	$422,988
Interest, dividends, etc	375,040	206,000	492,825
Deficit	$217,438	$200,651	$69,837
Gross earn. per mile	6,685	2,415	5,111
Net " " "	1,946	46	1,876
Per cent. of expenses	78.98	98.09	63.22

The total loss to the lessee on these three lines was $487,926 for the year, or considerably less than the profits on the Pittsburgh, Ft. Wayne & Chicago lease.

Cleveland & Pittsburgh.

This company owns a line from Rochester, Pa., to Cleveland, O., 124 miles; from Yellow Creek, O., to Bellaire, 42.75 miles, and from Bayard, O., to New Philadelphia, 32.75 miles, making 199.50 miles in all. Its trains run over the Pittsburgh, Fort Wayne & Chicago track from Rochester to Pittsburgh, 26 miles, making 225.50 miles worked. The whole property is leased to the Pennsylvania Company at a rental equal to interest on the bonds and 7 per cent. on the stock.

The company's balance sheet at the close of 1878 was as follows:

Stock ($56,361 per mile)		$11,244,030.35
Bonds ($25,360 per mile)		5,059,343.63
Income account		733,214.39
Accounts and balances		381,816.77
Total		$17,418,411.14
Road and property ($82,650 per mile)	$16,488,718.67	
Cash	315,027.85	
Stocks and securities	136,086.97	
Bills and accounts receivable	217,366.99	
Materials account, lessee	261,210.66	
		17,418,411.14

The earnings for the year, as reported by the lessee, were as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Passengers	$432,078	$460,745	D. $28,667	6.2
Freight	1,751,447	1,766,228	D. 14,781	0.8
Mail, express, etc.	88,641	103,861	D. 15,220	14.6
P., Ft. W. & C., joint earnings	202,468	61,492	I. 140,976	229.2
Total	$2,474,634	$2,392,326	I. $82,308	3.4
Expenses	1,306,054	1,291,662	I. 14,392	1.1
Net earnings	$1,168,580	$1,100,664	I. $67,916	6.4
Gross earn. per mile	10,974	10,609	I. 365	3.4
Net " " "	5,182	4,925	I. 257	6.4
Per cent. of expenses	52.77	53.99	D. 1.22	6.7

The net result to the lessee has been as follows:

Net earnings		$1,168,580
Dividends	$786,795	
Interest, etc	461,797	
Sinking funds	68,100	
		$1,316,692
Loss for the year		$148,112

In 1877 the loss was $207,111; previously the lease had always returned a profit to the lessee. The company's report says:

"The obligations of the lessee have been promptly and faithfully performed, and your property maintained in thoroughly effective condition. Two thousand tons of steel rail and 120,000 cross-ties have been put into the track. All the cars destroyed at the Pittsburgh riots in July, 1877, have been restored to the service. The main line between Cleveland and the Ohio River is now laid with steel rail, except five miles from the Workhouse, north through the city of Cleveland, where trains are confined to a slow rate of speed, and 12 miles between Alliance and Bayard. There are also six miles of steel rail laid from Yellow Creek eastward toward Pittsburgh, making in all 87 miles of steel track. * * * *

"The income of your property has been sustained in a remarkable degree through the depression following the revulsion of 1873, never falling below a clear net revenue of 5 per cent. to the lessee, and averaging 6.4 per cent. for the five years after payment of all obligations, sinking fund contributions included, while stockholders have regularly received the 7 per cent. income guaranteed by the lessee. Few, if any, railroad properties exhibit so good a record for the same period."

Cleveland, Tuscarawas Valley & Wheeling.

This company owns a line from Black River, O., to Uhrichsville, 101 miles. The following statements are from the reports for the year ending Dec. 31, 1878, made at the recent annual meeting in Cleveland.

There were carried during the year 131,617 passengers and 543,492 tons of freight, the freight being chiefly coal. The earnings for the year were as follows:

Passengers	$73,186.63
Freight	391,544.15
Other sources	9,794.64
Total ($4,698.27 per mile)	$474,525.42
Expenses (72.80 per cent.)	345,434.66
Net earnings ($1,278.13 per mile)	$129,090.76

There was paid from net earnings $76,194.08 for new equipment, etc., leaving a net surplus of $52,896.68 for the year.